

In the woods of the counties Down, Antrim, and Fermanagh*, this bird has occurred to me. Mr. J. V. Stewart notices it as found in the north of the county of Donegal; Mr. R. Ball, as met with about Dublin and Youghal; to the Rev. Thomas Knox it is known as common in some parts of Westmeath, and about Killaloe; by Mr. R. Davis, jun., it is reported to be not uncommon in Tipperary; and that the species is common in Kerry, I was informed by the late Mr. T. F. Neligan. Such of these birds as have come under my observation, though apparently aware of my presence, never exhibited any shyness, but admitted of a near approach, when it was extremely interesting to observe the regular, quick, and business-like manner in which they searched for their food. Now one would appear moving in a straight line up the trunks of the largest pines, from near the base until it would almost reach the summit; then it would be seen ascending the next tree to which it flew, by spirally winding round it, the effect being much heightened by its breast, in contrast with the dark-coloured bark, appearing of a silvery whiteness. Mr. R. Ball has "known the creeper to be captured by boys getting to the opposite side of a tree at the base of which it commenced feeding, and making a random stroke with a cap or hat, at the place they supposed it had reached in its upward movement." This species is generally stated by authors to live entirely on insects; but the stomachs of the only two I have examined, contained each, in addition to such food, a few seeds of the common pine (*Pinus sylvestris*): the specimens were shot in the month of January. Wilson, in his 'American Ornithology,' mentions his having found the seeds of the pine-tree (of course a different species from *P. sylvestris*) in the stomachs of individuals killed in the United States, and likewise "fragments of a fungus that vegetates on old wood." Mr. Macgillivray gives a very full and graphic description of the creeper, 'Brit. Birds,' vol. iii.

[To be continued.]

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL SOCIETY.

Dec. 16, 1841, and Jan. 6, 1842.—A paper was read, entitled, "On Fibre," by Martin Barry, M.D., F.R.SS. Lond. and Edin.

The author observes, that, in the mature blood-corpusele, there is often seen a flat filament, already formed within the corpusele. In Mammalia, including Man, this filament is frequently annular; sometimes the ring is divided at a certain part, and sometimes one extremity overlaps the other. This is still more the case in Birds, Amphibia, and Fishes, in which the filament is of such length as to con-

* Here I have seen it close to the house at Florence Court; and a friend living near Belfast has observed this bird creeping up the yard-wall attached to his dwelling-house. There is in reality nothing remarkable in such cases: they are mentioned, as some persons imagine that the creeper never leaves the depth of woods.

stitute a coil. This filament is formed of the discs contained within the blood-corpuscle. In Mammals, the discs entering into its formation are so few as to form a single ring; and hence the biconcave form of the corpuscle in this class, and the frequent annular form of the filament it produces. In the other Vertebrata, the discs contained within the blood-corpuscle are too numerous for a single ring; and they consequently form a coil. At the outer part of this coil, the filament, already stated to be flat, often presents its edge; whence there arises a greater thickness of the corpuscle, and an appearance of being cut off abruptly at this part; while in the centre there is generally found the unappropriated portion of a nucleus; and hence the central eminence, surrounded by a depression, in those corpuscles which, from the above-mentioned cause, have the edge thickened. The nucleus of the blood-corpuscle in some instances resembles a ball of twine; being actually composed, at its outer part, of a coiled filament. In such of the invertebrata as the author has examined, the blood-corpuscle is likewise seen passing into a coil.

The filament, thus formed within the blood-corpuscle, has a remarkable structure; for it is not only flat, but deeply grooved on both surfaces, and consequently thinner in the middle than at the edges, which are rounded; so that the filament, when seen edgewise, appears at first sight to consist of segments. The line separating the apparent segments from one another is, however, not directly transverse, but oblique.

Portions of the clot in blood sometimes consist of filaments having a structure identical with that of the filament formed within the blood-corpuscle. The ring formed in the blood-corpuscle of Man, and the coil formed in that of Birds and Reptiles, have been seen by the author unwinding themselves into the straight and often parallel filaments of the clot; changes which may be also seen occurring in blood placed under the microscope before its coagulation; and similar coils may be perceived scattered over the field of view, the coils here also appearing to be altered blood-corpuses, in the act of unwinding themselves; filaments, having the same structure as the foregoing, are to be met with apparently in every tissue of the body. The author enumerates a great variety of organs in which he has observed the same kind of filaments.

Among vegetable structures, he subjected to microscopic examination the root, stem, leaf-stalk, and leaf, besides the several parts of the flower: and in no instance of phanerogamous plants, where a fibrous tissue exists, did he fail to find filaments of the same kind. On subsequently examining portions indiscriminately taken from ferns, mosses, fungi, lichens, and several of the marine algæ, he met with an equally general distribution of the same kind of filaments. The flat filament seen by the author in all these structures, of both animals and plants, he states to be that usually denominated a *fibre*. Its appearance is precisely such as that of the filament formed within the corpuscle of the blood. It is known, he remarks, that discoid corpuscles circulate in plants; and it remains to be seen whether or not filaments are formed also in these.

By gradually tracing the fibre or filament above-mentioned into similar objects of larger size, the author endeavours to show that it is not possible to draw a line of separation between the minutest filament, and an object being to all appearance composed of two spirals running in opposite directions, and interlacing at certain regular intervals; an arrangement which produces in the entire object a flattened form, and gives it a grooved appearance. It is, in fact, the structure which, for want of a better term, he has called a *flat filament*. The edge of this filament presents what, at first sight, seem like segments, but which, in reality, are the consecutive curves of a spiral thread. A transverse section of such an object is rudely represented by the figure 8. This is also precisely the appearance presented by the minutest filament, generally termed *Fibre*: and the author particularly refers to the oblique direction of the line separating the apparent segments in the smaller filament, in connexion with the oblique direction of the spaces between the curves of the spiral threads in the larger one.

The spiral form, which has heretofore seemed wanting, or nearly so, in animal tissues, is then shown to be as general in animals as in plants. Nervous tissue, muscle, minute blood-vessels, and the crystalline lens, afford instances in proof of this. And if the author's view of identity in structure between the larger and the smaller filaments be correct, it follows that spirals are much more general in plants themselves than has been hitherto supposed; spirals would thus appear, in fact, to be as universal as a fibrous structure.

The tendency to the spiral form manifests itself very early. Of this the most important instance is afforded by the corpuscle of the blood, as above described. The author has also obtained an interesting proof of it in cartilage from the ear of a rabbit; where the nucleus, lying loose in its cell, resembled a ball of twine, being composed at its outer part of a coiled filament, which it was giving off to weave the cell-wall;—this cell-wall being no other than the last-formed portion of what is termed the intercellular substance—the essential part of cartilage. These nuclei in cartilage, as well as those in other tissues, there is ground for believing to be descended, by fissiparous generation, from the nuclei of blood-corpuscles.

The author then describes the mode of origin of the flat filament or fibre, and its reproduction in various animal and vegetable tissues, which he enumerates. He conceives that each filament is a compound body which enlarges, and, from analogy, may contain the elements of future structures, formed by division and subdivision, to which no limits can be assigned.

He then traces the formation of muscle out of cells, which, according to his observations, are derived from corpuscles of the blood, to the state where there exists what is denominated the *fibril*. In this process, there are to be observed the formation of a second order of tubes within the original tube; a peculiarly regular arrangement of discs within these second tubes; the formation, first of rings and then of spirals, out of discs so arranged; the interlacing of the spirals; and the origin, in the space circumscribed by these, of spirals having

a minuter size; which in their turn surround others still more minute; and so on. The outer spirals enter for the most part into the formation of the investing membrane discovered by Schwann, but for the only complete description of which, in a formed state, we are indebted to Mr. Bowman. The inner spirals constitute what are denominated the *fibrillæ*. The fibril appears to the author to be no other than a state of the object which he designates a *flat filament*; and which, as he shows, is a compound structure. The fibril he finds to be, not round and beaded, as it has been supposed, but a flat and grooved filament; the description above given of the structure of the filament being especially applicable here. This flat filament is so situated in the fasciculus of voluntary muscle, as to present its edge to the observer. It seems to have been the appearance presented by the edge of this filament, that is to say, by the curves of a spiral thread, that suggested the idea of longitudinal bead-like enlargements of the fibril, as producing striæ in the fasciculus of voluntary muscle. In the author's opinion, the dark longitudinal striæ are spaces (probably occupied by a lubricating fluid) between the edges of flat filaments, each filament being composed of two spiral threads, and the dark transverse striæ, rows of spaces between the curves of these spiral threads. The filament now mentioned, or its edge, seems to correspond to the *primitive marked thread* or *cylinder* of Fontana—to the *primitive fibre* of Valentin and Schwann—to the *marked filament* of Skey—to the *elementary fibre* of Mandl—to the *beaded fibril* of Schwann, Müller, Lauth, and Bowman—and to the *granular fibre* of Gerber. The changes known to be produced by the alternate shortening and lengthening of a single spiral are exhibited in the microscope by a fasciculus of spirals, not only in its length and thickness, but in the width of the spaces (*striæ*) between the curves of the spirals. And a muscle being no other than a vast bundle of spirals, it is in contraction short and thick; while in relaxation it is long and thin; and thus there occurs no flattening of bead-like segments in contraction. The author has found no segments that could undergo this change. These observations on the form of the ultimate threads in voluntary muscle, were first made on the larva of a Batrachian reptile; and have been confirmed by an examination of this structure in each class of vertebrated animals, as well as in the Crustacea, Mollusca, Annelida, and Insects.

He finds that the toothed fibre, discovered by Sir David Brewster in the crystalline lens, is formed out of an enlarged filament; the projecting portions of the spiral threads in the filament, that is, the apparent segments, becoming the teeth of that fibre.

The compound filaments are seen with peculiar distinctness in the blood-vessels of the arachnoid membrane. In connexion with the spiral direction of the outer filament in these vessels, the author refers to the rouleaux in which the red blood-discs are seen to arrange themselves, in the microscope, as probably indicating a tendency to produce spiral filaments. To form rouleaux, corpuscle joins itself to corpuscle, that is to say, ring to ring; and rings pass into coils. The union of such coils, end to end, would form a spiral. But the formation by the blood-corpuscles of these rouleaux is interesting in

connexion with some facts recorded by the author in a former memoir; namely, that many structures, including blood-vessels, have their origin in rows of cells derived from corpuscles of the blood. The human spermatozoon presented a disc with a pellucid depression, each of the two sides of the peripheral portion of which was extended into a thread; these two threads forming by being twisted the part usually designated as the tail. The occurrence of two tails, observed by Wagner, is accounted for by the author by the untwisting of these threads.

The author has noticed very curious resemblances in mould, arising from the decay of organic matter, to early stages in the formation of the most elaborate animal tissues, more particularly nerve and muscle. Flax has afforded satisfactory evidence of identity, not only in structure, but in the mode of reproduction, between animal and vegetable fibre.

Valentin had previously stated that in plants all secondary deposits take place in spiral lines. In the internal structure of animals, spirals have heretofore seemed to be wanting, or very nearly so. Should the facts recorded in this memoir, however, be established by the researches of other investigators, the author thinks the question in future may perhaps be, where is the "secondary deposit" in animal structure, which is not connected with the spiral form? The spiral in animals, as he conceives he has shown, is in strictness not a secondary formation, but the most primary of all; and the question now is, whether it is not precisely so in plants.

In a postscript the author observes, that there are states of voluntary muscle in which the longitudinal filaments ("fibrillæ") have no concern in the production of the transverse striæ; these striæ being occasioned by the windings of spirals, within which very minute bundles of longitudinal filaments are contained and have their origin. The spirals are interlaced. When mature, they are flat and grooved filaments, having the compound structure above described. With the shortening of the longitudinal filaments ("fibrillæ") in muscular contraction, the surrounding spirals, and of course the striæ, become elongated and narrow; while in relaxation these changes are reversed.*

GEOLOGICAL SOCIETY.

April 7, 1841.—"A note by Mr. Murchison on a Section and a List of Fossils from the State of New York," by James Hall, Esq., was read.

Mr. Murchison says, that in consequence of the researches of Mr. Featherstonaugh, Mr. Conrad, Mr. Hall, Mr. Vanuxem, Mr. R. C. Taylor, and other geologists, large tracts in the British colonies in North America and in the United States have been for some time known to be composed of formations containing Silurian, old red sandstone and carboniferous fossils. Mr. Hall's section, presenting a tabular view of the succession of formations, commences with the

[* We learn that the author has satisfactorily demonstrated to Professor Owen and others, since the reading of the above paper, the facts described in it.—*EDIT.*]

red sandstone of Blossburgh in Pennsylvania, proved to be the representative of the old red sandstone or Devonian system of Great Britain, in consequence of its inclosing remains of *Holoptychius* and *Coccosteus*. This deposit is succeeded in descending order by others, referable, on account of their testaceous remains, to the lower part of the same system, and these are again underlaid by limestones and shales, especially at Lockport and Rochester, charged with *Ptilodictya lanceolata* and other Silurian corals and fossils. The lowest deposit alluded to by Mr. Hall is the Medina sandstone. The following sectional list, in descending order, is copied from his communication:—

Red sandstone.

Sandstone and shale, abundance of fossil shells.

Shale, with thin layers of sandstone; *Fucoides*, abundance; few shells.

Green and black shale, several hundred feet thick.

Black shale.

Moscow shale.

Encrinal limestone.

Ludlowville shale.

Thin mass, with *Bellerophons*.

Shale.

Thin limestone, with fossils.

Marcellus shale.

Limestone, with hornstone.

Onondaga limestone.

Onondaga saliferous group, containing gypsum and salt-springs.

Lockport limestone.

Rochester shale.

Limestone.

Green shale, with fossils.

Pentamerus limestone.

Green shale and iron ore.

Red and grey sandstone, Medina sandstone*.

With respect to the Onondaga saliferous group, Mr. Murchison points out its extremely low geological position, resting upon a calcareous stratum, which has been proved by its organic remains to be the equivalent of the Wenlock limestone; and he states that it is of higher antiquity than the oldest salt-bearing beds of Russia. Mr. Murchison also alludes to the great value of Mr. Hall's communication in proving the wide application of the palæozoic succession established in Great Britain.

June 2.—“On the Faluns of the Loire, and a comparison of their Fossils with those of the newer Tertiary Strata in the Cotentin, and on the relative age of the Faluns and Crag of Suffolk,” by Charles Lyell, Esq., V.P.G.S.

In a paper “On the Crag of Norfolk and Suffolk,” read in 1839 †,

* For detailed accounts of the New York Devonian and Silurian Systems and their Organic Remains, see the Geological Reports of the State for 1838, 1839, 1840.

† Proceedings, vol. iii. p. 171. 1839.

Mr. Lyell stated, that when M. Desnoyers assigned in 1825 a contemporaneous origin to the Crag and the Faluns of Touraine, he dissented from the conclusion; first, because the percentage of recent species then assigned to the crag, including the Norwich beds, was greater than that ascribed by M. Deshayes to the shells of Touraine; 2ndly, because almost all the fossils in each locality were of distinct species, though only 300 miles apart; and 3rdly, because the fauna of the Suffolk crag had a northern, and that of Touraine an almost tropical aspect, notwithstanding the geographical proximity of the two districts. In 1839, however, when he compared, with the assistance of Mr. G. Sowerby, a large collection of Touraine shells, and ascertained that the recent species amounted to 26 per cent., a nearly similar result to the one at which he had previously arrived respecting the red and coralline crag, he was induced to adopt M. Desnoyers' views. As some doubts nevertheless remained in his mind respecting the localities and true geological position of certain shells assigned to the Faluns, and as he was desirous of determining the range southwards of the organic remains of the English crag, as well as northwards of those of the Faluns, and ascertaining whether the fossils of the most northern of the Falun deposits approached nearest in character to the shells and corals of the English crag, Mr. Lyell examined in the summer of 1840, first, certain of the newer tertiary deposits in La Manche, particularly those near Valognes, and between Carentan and Coutances; then the tertiary strata in the neighbourhood of Dinan and Rennes; and afterwards those along the course of the Loire from Nantes to Tours and Blois, extending his researches northwards of that river as far as Savigné, and southwards to Bossée and Pontlevoy. The following notices contain summaries of the observations made at each locality.

Crag.

Tertiary strata near Valognes.—The first geologist who explored the Cotentin was M. De Gerville. M. Desnoyers, in his memoir on that part of Normandy (published in 1825), shows that the newest secondary rock near Valognes is Baculite limestone*, and that it is overlaid by patches of tertiary strata, of the age of the Paris basin; but he does not allude to any deposit of more recent date. By the advice of M. De Gerville, Mr. Lyell visited a marl-pit at the farm of Cadet, near Ranville la Place, eight miles south-west of Valognes, and he found it to abound with Suffolk crag shells. He obtained twenty-nine species of Testacea, fifteen of which Mr. Searles Wood has identified distinctly with crag species, and seven doubtfully, the most abundant shell being *Lucina radula*. In M. De Gerville's collection from this locality, Mr. Lyell saw a specimen of the Falun variety of the *Voluta Lamberti*, or of what he considers to be a distinct species of *Voluta*. It is stated to have been found under an oyster-bed, and beneath the stratum containing the above shells.

* Mr. Lyell examined this limestone, and recognised its resemblance to the uppermost chalk at Faxoe in Seeland. See 'Proceedings,' vol. ii. p. 191, and 'Geol. Trans.,' 2nd Series, vol. v. p. 248, for an account of the Faxoe deposit.

Carentan.—At St. George de Bohon, five miles south-west of Carentan, is another deposit of Suffolk crag fossils. In travelling south from Carentan this formation is first met with at the hamlet of La Flaget. It consists of an iron-stained calcareous tufa, or an aggregate of fragments of organic remains, and is in some places thirty feet thick. The shells are difficult to extract, but Mr. Lyell obtained fourteen species; also three species of corals, and a caudal tubercle of a *Raia*, all of which have been identified with Suffolk crag fossils. Among the shells are numerous fragments of the large *Terebratula variabilis*. The corals and some of the Testacea are common to the Faluns of Touraine, but none of the distinguishing fossils of the latter have been discovered in the Carentan deposits.

Sainteny.—In sinking a well at this place, more than sixty feet of a white calcareous aggregate of comminuted shells were passed through. At Longueville, one and a half mile from Sainteny, is a soft calcareous stone, consisting of innumerable casts of fragments of shells, among which Mr. Lyell detected the *Pecten striatus* of the Suffolk crag; and a similar rock occurs at the farms of Blehou and Raffanville, several miles distant. The fossils obtained at these localities could not be satisfactorily determined, but Mr. Lyell is of opinion that they agree with those which are found near St. George de Bohon, except that he observed no fragments of the *Terebratula variabilis*. As far as they can be identified, they consist of Suffolk crag species, and they do not appear to possess a character intermediate between the Suffolk fauna and that of the Faluns.

Mr. Lyell saw no recurrence of this crag further south, and the most northern point at which he noticed a deposit of the age of the Faluns of Touraine was near Dinan, sixty geographical miles to the south-east of Sainteny, the intermediate country consisting of ancient strata and crystalline rocks.

FALUNS.

Dinan.—M. Desnoyers does not describe the Falun near Dinan, although he alludes to it. The neighbourhood of Dinan is entirely composed of granitic rocks; but at the village of Evran, situated near a stream which flows into the Rance, seven miles south of Dinan, is a small tertiary deposit, consisting of ten or twelve feet of white coralline and shelly sand, overlaid by a bed of stiff, reddish-brown clay, of very variable thickness. The great irregularities presented at the junction of the two strata, and the occasional projection of continuous layers of the sand into the clay, Mr. Lyell explains by supposing that the former at the time of its denudation, and previously to the deposition of the clay, possessed a certain amount of hardness, which allowed of its being undermined. At the bottom of the sand occur large oysters, different from the common Touraine species *O. virginica*; and in the same quarries Mr. Lyell found many corals, fragments of Echinodermata, sharks' teeth, ribs of the Laman-tin, vertebræ of a *Delphinus*, and a tooth of a Mastodon. Some of the bones were buried in a solid semi-crystalline limestone, in which casts of shells are common. The formation occasionally

assumes a concretionary or travertine structure: at Le Quiou it is micaceous, and splits into flags; and at the village of Pas de Hac some pinnacles of soft, white, calcareous aggregate present in the lower part fine examples of cross-stratification. At St. Juvat the variety of building-stone called *La jauge*, and composed of comminuted organic remains, resembles the deposit near Sainteny, but the occurrence of casts of cones and large *Cyprææ* convinced Mr. Lyell that it must be assigned to the Faluns. It is overlaid by a bed of clay of variable thickness, having been very irregularly denudated; and it is penetrated by cylindrical hollows, similar to the sand-pipes in the English chalk. From these localities Mr. Lyell obtained twenty-six species of shells, one Cirriped, five species of Echinodermata, five of corals, and seven of fishes, besides the remains of Cetacea and Mammalia before mentioned. The shells are for the most part identical with species found in the Faluns of Touraine; the whole of the corals are well-known Touraine fossils; and the fishes, according to M. Agassiz, have been all found in the molasse of Switzerland, with the exception of one species, *Carcharias megalodon*. In the solid limestones of the localities above enumerated, many of the shells, which in several places in Touraine are beautifully preserved, occur only as casts.

Rennes.—The country between Dinan and Rennes consists of ancient rocks. M. Desnoyers states, in the memoir before alluded to, that tertiary beds of the age of the Paris basin and of the Faluns occur near Rennes, but Mr. Lyell is not aware of any published account of the fossils. In the ancient quarries of St. Gregoire, to which he was conducted by M. Pontallier, he found corals and casts of shells of Touraine species; also a large *Spatangus*, a claw of a crab, and teeth of sharks, imbedded in soft and hard limestones similar to those near Dinan. At La Chaussairie, five miles south of Rennes, occurs a perfectly distinct limestone, containing *Milliolites* and casts of marine shells, resembling those of the Paris basin; and associated with it are green and blue marls, enclosing freshwater Testacea. The deposit is of small extent, and rests upon transition strata; but Mr. Lyell suspects that it is in places overlaid by the ruins of the true Faluns, and that from these were derived the remains of a Lamantin and a tooth of *Carcharias megalodon*, found in the debris of a shaft sunk at La Chaussairie.

Nantes.—The district between Rennes and Nantes consists of transition and granitic rocks, but there are many detached patches of Miocene strata around Nantes. At Les Cleons is a soft coralline limestone, containing pebbles of quartz and spangles of mica, the fundamental rock of the country being mica-schist. Mr. Lyell obtained from the limestone six species of corals and five of Testacea, the whole of which, capable of determination, belong to Touraine fossils. In the museum at Nantes he saw specimens which indicate the existence of Falun strata at Le Loroux, Vieilleville and Limousinière, places within thirty miles of Nantes; also other organic remains which prove that Eocene strata occur at Cambon.

Angers.—Mr. Lyell was prevented from examining the pits north

of this place, but he was presented by M. Millet with an extensive suite of shells and corals, collected by that gentleman. Of fifty-seven species of Testacea, all but thirteen occur in the Faluns near Tours, Savigné and Pontlevoy; but the fact of there being thirteen peculiar to the Angers district induces Mr. Lyell to suspect that the fossils depart more than those of other localities from the common type. The collection contains also only nine species which can be positively identified with known recent shells, and one which is doubtful, giving about seventeen per cent. of existing species, a much smaller proportion than was obtained by the author in other localities.

Doué.—At this town are extensive quarries of a calcareous building-stone, composed of comminuted shells and corals, and exposed to the depth of forty feet. The beds are horizontal, but exhibit highly inclined cross-stratification. From the marl-beds at La Grézille, and the calcareous sand and limestone of Renaudan and Illet, villages situated six or seven miles north of Doué, Mr. Lyell procured twenty-four species of corals, four of Echinodermata and three of fishes; also a few species of shells, the most conspicuous being the large *Pecten solarium*. In the great abundance of corals and Echinoderms, and the small number of Mollusks, Mr. Lyell states that this deposit presents a perfect analogy to the white or coralline crag of Suffolk; but that its fauna is as distinct, with respect to species, from the fauna of the coralline crag, as the other localities of the Faluns of the Loire generally.

Savigné.—Between Doué and Savigné the country consists partly of the Eocene freshwater formation, which extends thence almost continuously to Paris, and partly of *Craie tufeau*. Near Savigné the Falun is composed of limestone, containing most of the Doué fossils. The result of Mr. Lyell's labours in this neighbourhood gave the following amount of organic remains, obtained chiefly from a pit which he had made near the point where the road from Savigné to Channay divides from that leading to Courcelles. The total number of species of corals which have been determined amounts to eighteen, of Echinodermata to two, of Testacea to seventy-six, and of fishes to four. Mr. Lyell also obtained an upper molar of a deer, and a molar of the *Chæropotamus Cuvieri*. Of the shells, only ten species were not found by the author at other Falun localities near the Loire; and twenty-three species, or about thirty per cent., have been identified with recent shells. Among the fishes is *Lamna contortidens*, a species which occurs in the Suffolk crag. The tooth ascertained by Mr. Owen to belong to the *C. Cuvieri*, affords, Mr. Lyell states, another instance of a mammifer common to Eocene and Miocene periods.

District south of Tours.—The immediate neighbourhood of Tours consists of cretaceous valleys, with intervening platforms of Eocene freshwater strata. The Faluns occur from twelve to sixteen miles to the south, at Louans, Manthilan and Bossée. At Louans the deposit is exposed in pits from four to five yards deep, and consists of white and yellow marl, formed, to a great extent, of comminuted shells and corals. From this bed Mr. Lyell obtained 180 species of

shells, many very small, and generally overlooked by collectors; the corals hitherto determined amount to only six species. Of the Testacea he procured all the species, except thirty-three, at other localities; and the recent species have been ascertained to be about forty-nine, or in the proportion of twenty-six per cent. At Bossée he obtained 129 species of Testacea, forty of which, or thirty-two per cent., have been identified with living shells; and of the entire number Mr. Lyell found all except thirteen in some of the other Faluns. Six species of corals, and remains of *Lamna* and *Myliobates*, have been also ascertained to occur at Bossée; and a posterior molar tooth which Mr. Lyell procured there, Mr. Owen has proved to belong to the *Dichobunes*, a genus of *Pachyderms*, found likewise in the Eocene strata of France and the Isle of Wight.

Pontlevoy.—At this town, thirty miles south-east of Tours, a patch of white Falun marl rests on the Eocene freshwater formation. In the pits east of the town Mr. Lyell procured perfectly preserved shells; and fragments of the Eocene freshwater limestone are found in the Falun bored by *Petricolæ*, and full of their shells. The marl is usually covered by three feet of red clay, sand and mould. Mr. Lyell found here the first specimens of the shell, generally considered to be the *Voluta Lamberti* of the English crag, but which he believes to differ from it. During his researches at Pontlevoy he procured 163 species of shells, forty-five of which, or twenty-five per cent., have been identified with existing Testacea; and on comparing the whole number with a collection of 180 from Louans, 106 were found to be common to the two localities. Only thirty-four of the Pontlevoy shells were not procured by Mr. Lyell, at some other Falun locality. Not more than six species of corals have yet been ascertained to occur in this district. The other localities near Pontlevoy examined by Mr. Lyell are Sambin and Contres. At the former the white Falun, containing hard flags, is covered by a great deposit of red, ferruginous, stratified gravel, with grains of quartz and flint derived from the Eocene freshwater formation; and it bears a striking resemblance to the gravel-beds which overlie the red crag in Suffolk. Immediately east of Sambin, as well as between Contres and Soing, Mr. Lyell found specimens of the *Ostrea virginica* associated with fragments of other Testacea, which identified the deposits from which they were obtained with those of Touraine. These detached Faluns imply, he says, that a large part of France, now drained by the Loire and its tributaries, was submerged during the Miocene period, although it is only at a few isolated points that the evidence can be detected of the long time this submergence must have lasted, and of the distinctness of the fauna which then lived, both from that now existing, and still more from that of the antecedent Eocene epoch.

General Remarks.—Previously to his tour, Mr. Lyell considered that the collections which he had seen from the Loire might be divided into two groups, the larger resembling a Mediterranean or even a more northern fauna, and the smaller a tropical one; and that some of the shells composing the latter came from inferior beds of the de-

posit, or from patches of Falun of more ancient date than others: he also suspected, that where the tropical forms abounded, there would be found a smaller proportion of recent shells. He is, however, now convinced that all the shells belong to one group, or that the forty-four crag species were really contemporaneous in Touraine with the large cones, Cypræas, Fasciolarias, and other tropical forms of Testacea. At Bossée, where he found these large univalves, as well as the Astræa, Lunulites, and Dendrophyllia, most fully developed, he obtained the greatest proportion of recent shells, or thirty-two per cent., the average being twenty-five. In making the examinations upon which these results depend, Mr. Lyell states that he always had recourse to the assistance of Mr. G. Sowerby, and in doubtful cases to that of Mr. E. Forbes, or some other conchologist; and that he excluded from his calculations a great many species of which he did not possess perfect specimens, or a sufficient number to enable the specific identification to be confidently proved. Of the corals collected by the author, forty-three species have been determined by Mr. Lonsdale, only seven of which, or fifteen per cent., agree specifically with those found in the Suffolk crag. This percentage in the Polyparia is almost exactly the same as that which has been obtained from a comparison of the Testacea. Some of the genera of corals, fossil in Touraine, as the Astræa, Lunulites, and Dendrophyllia, have not been found in European seas north of the Mediterranean; nevertheless the Polyparia of the Faluns do not indicate a climate warmer than that which now prevails on the southern coasts of Europe.

The next general question considered by Mr. Lyell is, whether the Faluns of the Loire and the English crag can be referred to the same geological period, eighty-five per cent. both of the corals and the shells being of distinct species. "Can," he says, "such a conclusion be embraced on the ground of the corresponding degree of analogy which both deposits bear to the existing fauna, and to the extremely wide departure which both the crag and the Faluns make from the fossils of the Eocene period?"

When Mr. Lyell compared in 1839, with the assistance of Mr. Searles Wood and Mr. G. Sowerby, the Suffolk crag shells in Mr. Wood's cabinet, the proportion of recent species in the red crag was found to be about thirty per cent., and in the older or coralline about twenty, or, including both, twenty-five per cent., the same amount as in the Faluns of Touraine; the analogy of the recent crag-shells being almost entirely to shells of the British seas, and that of those of the Faluns mostly to Mediterranean species. The argument which might be derived in favour of the more modern origin of the crag, from the recent species being precisely those of the neighbouring seas, while the existing species of the Faluns are not to the same extent, Mr. Lyell combats by stating that the whole assemblage of English crag genera and species departs very widely from that of the adjacent seas, consisting of northern and southern forms. Thus the *Glycimeris*, *Cyprina* and *Astarte* are northern genera, and of the *Astarte* there are about fourteen species; and of genera now known as existing only in equatorial latitudes, are *Pyrula*, *Lingula*, and some

others. The fact, that four-fifths of coralline crag Testacea are extinct, implies high antiquity; as well as the sixteen species of Echinoderms found in the crag being unknown as recent species. The author therefore refers both the crag and Faluns to the Miocene epoch, notwithstanding the specific discordance of their fossils, and he is of opinion that this disagreement may be diminished when the two faunas are better known. The difference between the Testacea of the British coasts and of the Mediterranean is pointed out; and if the greater distance of these seas from each other than of the eastern shores of England from the Faluns should be urged as an objection to the inference that the crag and Faluns belong to one epoch, Mr. Lyell calls attention to the difference in the Testacea on the opposite sides of the isthmuses of Suez and Panama, though these tracts are very considerable, both in height and breadth. That land existed in the immediate neighbourhood of the Faluns, Mr. Lyell says, is proved, from the occurrence of the remains of terrestrial Mammalia, and of land and freshwater shells, though they are of rare occurrence, compared with the marine reliquæ; and if it formed a barrier between the district occupied by the crag and that by the Faluns, the more northern character of the crag fauna might be due to the sea in which it lived opening to the north; and in support of this opinion he alludes to the rapid transition in the southern hemisphere from a district possessing a mild and equable climate, in which tropical forms of Testacea exist with others common to high latitudes, to one of extreme cold. Lastly, Mr. Lyell says, whatever speculations may be indulged, it is clear that the fossils of the crag and Faluns are almost entirely different from those of the London clay and Paris basin; that at least one-fifth of the fossil shells, both in the crag and Faluns, are identical with recent species; that fifteen per cent. of the shells and corals of the Faluns are specifically identical with those of the Suffolk crag; and that the supposed difference of climate indicated to the Testacea and Polyparia is by no means so great as some observers have supposed. Mr. Lyell nevertheless does not attach such importance to the percentage of recent shells in the present state of knowledge of all the recent species, as to deduce from this source alone a positive inference regarding the precise agreement in age of the Faluns and the crag, merely stating that both deposits are referable to the Miocene epoch; and as the red and coralline divisions of the Suffolk crag were not formed at the same time, so he conceives there may have been shades of difference in the relative age of the Faluns and the crag.

June 16. "Description of a Newer Pliocene Deposit at Stevenston, and of Post-Tertiary Deposits at Stevenston and Largs, in the County of Ayr," by the Rev. David Landsborough, and communicated by James Smith, Esq., F.G.S.

The Newer Pliocene Deposit.—This stratum was discovered in 1839 in opening two coal-pits in the parish of Stevenston. After penetrating from thirty to thirty-five feet of sand, a bed of blue clay, nine feet thick, was passed through, and found to contain marine fossils of the newer Pliocene epoch. All the species have been obtained in other deposits of the same age in the basin of the Clyde, except two,

—*Astarte borealis*, which occurs in a fossil state in the crag and living in the Arctic seas, and *Astarte propinqua*, a new shell. Mr. Landsborough gives a list of the twenty-seven species collected by him, nineteen of which are common in the adjoining seas, six are known to exist in the Arctic seas, and two, *Natica glaucinoides*, a crag fossil, and *Astarte propinqua*, are believed to be extinct.

Post-Tertiary Deposits.—The author prefixes to his account of these beds a notice of the older formations in that part of Ayrshire. The prevailing rock is red sandstone, which, at almost every point on the coast, has been worn, by the former action of the sea, into cliffs, which indicate a change of level of about forty feet. The terrace at the base of the cliff, Mr. Landsborough states, may be considered a marine raised beach, and the shells contained in it are, with two exceptions, one of which is doubtful, of existing species.

At Ardrossan, a deposit twenty feet above the level of the sea, and at Kelly, the soil which covers the base of the inland cliff to the height of thirty feet, are full of common marine shells. Similar beds are stated to occur in the islands of Arran, Cumbra, and Inch Marnock. In the parish of Stevenston, immediately under the vegetable soil, is a bed of shingle, in which forty-seven species of shells common on the adjacent shores have been found. It rests upon shale perforated in many places by the *Pholas crispata*, of which the shell, in a very friable state, is generally found within the cavity.

At Largs the shore rises to the height of twenty feet above high water. Under a bed of loam, from five to ten feet above the sea-level, is a sandy stratum one foot thick, from which Mr. Landsborough has obtained specimens of *Millepora polymorpha*, and seventy species of marine shells, the whole of which are well-known inhabitants of the British seas, except two species of *Rissoa*, one of which had been previously found only in the crag, and the other is referred with doubts to the *Rissoa Harveyii* of Mr. Forbes.

Respecting the age of this deposit, Mr. Landsborough states, that 160 species having been found in it by Mr. Smith and other geologists, it would be rash to infer from the above two exceptions, "that there is a difference in the faunas of the existing period of sea-level and of that which preceded it;" but he thinks it is not improbable that some change may have taken place during the very long period in which the inland cliff was formed by the slow wasting of the sea; and he adds, the position of the bed at Largs, being ten feet under the surface, indicates a considerable antiquity, although its age must be much newer than that of the Pliocene strata, in which there is a decided proportion of extinct Testacea.

Lists of the shells found by the author at each locality accompany the paper.

"Notes by Mr. Maclauchlan, F.G.S., to accompany some Fossils collected by himself and Mr. Still, F.G.S., during their employment on the Ordnance Survey in Pembrokeshire."

Taking for a base-line the northern boundary of the Llandeilo flags laid down by Mr. Murchison, the author proceeds to describe a section extending from near Llanhuadain on the south, to Dinas

Head on the north. At Potter's Slade, a little north-west of Llanhuadain, a conglomerate dips to the northward, and is traceable westward to Ford, and eastward towards Llangan, where a sandstone conglomerate occurs containing Trilobites and shells. Proceeding on the line of section, the conglomerate is succeeded first by sandstone and sandstone shales, and then at Clarbeston by limestone with carboniferous shales, dipping northward, and containing Graptolites and casts of shells. Similar carbonaceous shales exist on the west of Clarbeston, at St. Catharine's Bridge, near Camrose; also at Rudbaxton, and on the east at Long Ford, near Llandysilio. They have in some localities been unsuccessfully worked for coal. Graptolites have likewise been found in calcareous shales at Robleston, about a mile north-west of Camrose. At Llys-y-fran, north of Clarbeston, the carbonaceous shales are succeeded by roofing-slates, which at Mynydd Castell-bythe (Castell-y-furoch, Ord. Map) and Morfel alternate with trap. On the summit of Mynydd Pontfaen, sandstone with coarse slates occurs, and between the summit and Pontfaen, trap again alternates with slates. The summit of Mynydd Llanllawer consists of coarse-grained, rudely columnar greenstone, flanked on the northern declivity of the mountain by coarse sandstone of trappean aspect. This rock is overlaid by roofing-slates, which extend nearly to Dinas Head, where a hard conglomerate sandstone, containing crinoidal remains, is exhibited. All these strata are represented in a section as dipping towards the north.

In Aberreiddy Bay, about twelve and a half miles to the south-west of Dinas, slaty beds with a northwardly dip, and apparently prolongations of the schists on the line of section, contain the *Graptolithus Murchisonii* and *G. foliaceus* of the Llandeilo flags, also numerous casts of an *Euomphalus*, resembling the *E. perturbatus* of that formation, and a species of *Lingula*. Although these slates differ in lithological characters from the Llandeilo flags, yet Mr. Maclauchlan is of opinion that this difference may have been produced by the masses of trap which are associated with the slates.

The conglomerate sandstone of Dinas Head, which occurs also in Newport Bay and at Trewyddel, near Cardigan, is stated to resemble one of the conglomerates of the Caradoc sandstone described by Mr. Murchison; and the crinoidal stems which it contains, to agree with analogous remains found by Mr. Murchison in the Caradoc sandstone at Little London, May Hill*.

In addition to the phenomena which occur in the immediate vicinity of the section, Mr. Maclauchlan alludes to indications of anticlinal lines near Narberth and at Camrose, in Southern Pembrokeshire; also at Solfach, south-east of St. David's, and at Porthllisky, to the south-west of that city. At the latter village the dip changes to the westward, and continuing to alter, assumes in Whitesand Bay a northwardly direction. This dip also prevails at St. Laurence, thirteen miles east of St. David's Head; at Leweston, three miles south of St. Laurence, and at Long Ford, about two and a half miles south of Llandysilio. Trappean ash also is stated to occur near green-

* Silur. Syst., pl. xx. fig. 19.

stone at Penbury (Penberry, Ord. Map) Hill, two and a half miles north-north-east of St. David's; at Llanllawer, two miles south-east of Fishguard; and at Carningley, one mile south of Newport.

Though the summit of the principal Pembrokeshire chain is roofing-slate, yet trap-rocks occur near the top, and are described by the author as continuous through the district, extending to Plumbstone Mountain (five miles north-west of Haverfordwest) and to St. David's Head, re-appearing at the Bishop and Clerks and the Hat and Barrels rocks, and at the Smalls light-house. At Fishguard and Strumble Head, three miles west of Fishguard Bay, the trap is columnar. On the north-east of the chain at Whitechurch (Eglwyswen), six miles south-east from Newport, on the east at Llanfyrnach (Llanfrynach, Ord. Map), and on the south at Llanglwydwen, are beds of dark carbonaceous shale, which have been fruitlessly worked for culm; they appear to mantle round the trap, but preserve a northerly dip; they are accompanied by lead-veins, one of which, at Llanfyrnach, has been worked successfully. At Llanglwydwen Bridge are indications of copper in a lode in contact with a considerable bed of limestone. Mineral veins also exist along the coast, from Newgate, in St. Bride's Bay, to St. David's Head.

“Description of some remains of a gigantic Crocodilian Saurian, probably marine, from the Lower Greensand at Hythe; and of Teeth from the same formation at Maidstone, referable to the genus *Polyptychodon*,” by Richard Owen, Esq., F.G.S.

The fossil saurian remains from the lower greensand discovered by Mr. H. B. Mackeson include portions of the iliac, ischial and pubic bones, a large proportion of the shaft of a femur, parts of a tibia and fibula, and several metatarsal bones. In consequence of the absence of vertebræ and teeth, the determination of the specific characters of this Saurian is, the author states, a subject of great difficulty, and he therefore confines his remarks, in the present paper, to indications of the characters by which it differs from previously known extinct genera of Saurians. In the first place, Mr. Owen shows, from the femur and other long bones having no medullary cavities, but a central structure composed of coarse cancelli, that the animal of which they formed part was of marine habits; he, however, adds, that the principal bone being a femur, independently of the size and shape of the metatarsals, at once negatives the idea that these remains belonged to the cetacean order; and that the form and proportions of the metatarsals equally forbid their reference to any other mammalian genus.

Femur.—The portions of this bone secured by Mr. Mackeson include about the two distal thirds, excepting the articular extremity. Its length is two feet four inches, its circumference in the middle or smallest part of the shaft is fifteen inches six lines, and at the broken distal end, two feet five inches. These dimensions prove that the animal was equal to the most gigantic described *Iguanodon**. If

* Femur of the *Iguanodon*,—length, 4 feet 6 inches; smallest circumference, 1 foot 10 inches.

the supposition of the proportion of the femur which has been preserved be right, this bone, Mr. Owen says, differs from that of the Iguanodon, not only in the want of a medullary cavity, but also in the absence of the compressed second trochanterian process which projects from the outer side of the middle of the shaft, and which forms one of the several curious analogical relations between the Iguanodon and Rhinoceros. The bone also expands more gradually than in the femur of the Iguanodon, and the posterior part of the condyles must have been wider apart in consequence of the posterior inter-condyloid longitudinal excavation being longer and wider. Various other minor points of difference are noticed by the author.

Tibia and Fibula.—The portion of a tibia which has been preserved is compressed near its head, and the side next to the fibula is slightly concave. The longest transverse diameter is eight inches nine lines, and the two other transverse diameters at right angles to the preceding give respectively three inches three lines and two inches six lines. The bone soon assumes a thicker form, its circumference at about one-third from its proximal end being sixteen inches six lines. The cancelli occupying the central portion of the bone are arranged in a succession of layers around a point nearest the narrower end of the transverse section. Lower down the tibia again becomes compressed, and towards the distal end the transverse section exhibits a plate bent towards the fibula, and its narrowest transverse diameter is two and a half inches.

The portion of the fibula is eleven and a half inches long. In the middle it is flat on one side, slightly concave on another, and convex on the two remaining sides. It presents the same cancellous structure as the tibia, but the concentric arrangement of the layers of cells is more exact. Towards the opposite end of the bone the concave side becomes first flat and is then produced into a convex wall, terminating one end of a transverse section of a compressed and bent thick plate of bone.

Metatarsals.—These bones, Mr. Owen says, exhibit the characteristic irregularity of length of the crocodilian metatarsals. Of two imbedded in the rock, and considered by the author to be the innermost and second, the former or smaller measured one foot in length, and the latter two feet, having a diameter of eight inches at its greater and of four inches five lines at its narrowest or middle part, and of six inches at its other extremity, which was imperfect. The whole of the bone within the compact outer crust consisted of cells varying from a half to two-thirds of a line in diameter. Portions of four other detached metatarsals are described.

Ilium, Ischium, Pubis, and Coracoid Bone.—These bones, the author states, also conform to the crocodilian type. The remains of the ilium are flat and nearly straight, and they gradually but slightly widen towards one end. Of one ilium, a portion, twenty-five inches long and ten inches across at the broadest end, is preserved, and of the other a fragment twenty inches in length.

The mesial extremities of the pubis and ischium are preserved in the same block of stone. The pubis, Mr. Owen states, differs from

the crocodilian type in its greater breadth. The portion exposed in this block is principally convex, but it becomes concave towards the opposite or median margin. At its broadest part it is thirteen inches across, and its length is seventeen inches. This expanded extremity is rounded, and the diameter of the corresponding expanded extremity of the ischium, which is obliquely truncated, is nine inches. In another block of stone the expanded extremity of the opposite pubis is preserved, and measures fourteen inches across and twenty-two inches in length.

The bone, considered by Mr. Owen to be a coracoid, is two feet in length and seventeen inches in its greatest breadth, and it varies in thickness from three to five inches. The breadth of this bone indicates, the author states, the great development of the muscles destined for the movement of the fore-leg, whence he infers that the anterior extremities were more powerfully and habitually used in progressive motion than in the Crocodiles, and that they were consequently provided with a webbed modification of the hand.

Mr. Owen then enters upon the question of the identity or affinities of the Hythe remains with any of the known marine genera of the saurian order, the texture of the long bones being conclusive against their having belonged to the terrestrial genera, the *Iguanodon* and *Megalosaurus*.

The length, thickness, and indications of condyles in the femur, and the length, thickness, and angular form of the metatarsal bones, place, he says, the *Plesiosaurus* and the *Ichthyosaurus* out of the pale of comparison; as well as the *Mosasaurus*, the locomotive extremities of which are considered to have been flattened paddles.

The superior expanse of the pubis and the broad coracoid (?), with the form of the femur and the gigantic proportions of the bones, forbid a reference to any subgenera, recent or extinct, of the crocodilian reptiles; and he shows that it is distinct from the *Poikilopleuron* of M. Deslongchamps by the long bones of that Saurian having medullary cavities.

Saurian Teeth from the Lower Greensand.—These teeth, described by Mr. Owen in his 'Odontography' under the name of *Polyptychodon*, are characterized by the crown presenting numerous closely set longitudinal ridges, which are continued, of nearly equal length, to near the apex of the crown. In their size and simple conical form the teeth of the *Polyptychodon* resemble those of the great sauroid fish, *Hypsodon*, Ag., but may be distinguished by the solid compact structure of the dentine, which is resolved by decomposition into successive cones; and also by the ridges on the exterior of the crown of the *Hypsodon*'s teeth being alternately long and short, and terminating abruptly at different distances from the base, the interspaces between the longer ridges widening as they approach the apex. The tooth of the *Polyptychodon* is slightly and regularly curved, and invested with a layer of enamel of a clear, amber-brown colour, and of which the ridges are composed, the surface of the outermost layer of dentine being smooth. A tooth from the lower greensand near Maidstone has a crown three inches long, and one inch four lines

across the base. It consists of a body of compact dentine composed of successive lamelliform cones, and has a short and wide conical cavity at the base.

From the teeth supposed to have belonged to the Poikilopleuron, the specimens above described differ in the ridges on the crown being greater in number and more closely set, as well as in the form of the teeth being nearly circular instead of elliptical; from the teeth of the Pliosaurus they differ also in being round and not three-sided, and in having longitudinal ridges over the whole surface of the crown; and from the teeth of the Mosasaurus they differ in being ridged and not smooth.

In conclusion, Mr. Owen states, that as the Hythe Saurian is distinct from all other described Saurians, and as these teeth belonged to a great Saurian also undescribed, and further, as the Maidstone tooth was found in the same formation as the Hythe fossil, so it may be convenient to consider all these remains for the present to have belonged to the genus Polyptychodon, originally proposed for the animal which was provided with the teeth.

ZOOLOGICAL SOCIETY.

April 13, 1841.—William Yarrell, Esq., Vice-President, in the Chair.

The following paper, on some new genera of Birds, by Hugh E. Strickland, Esq., was read.

“It is not without some unwillingness that I venture to point out some new generic groups of birds, because I am of opinion that the process of naming and defining new genera has been in many cases carried too far already. The class of birds probably does not contain more than 6000 species, and these have already been distributed into upwards of 1000 genera, and I think therefore there can be no doubt that systematic ornithologists are now fast approaching the point beyond which it will not be expedient to carry the subdivision of the older groups into new genera. For we must not lose sight of the fact, that expediency or practical convenience *does* form an element in the construction even of a natural system. In such a system the *materials* which constitute any group must be naturally allied, and they must be placed in such *order* as will best show their natural affinities, and yet the number of nominal genera into which such a group is to be divided may be a question of mere expediency. For the *species*, which are the only *real* ingredients in a family or subfamily, often pass from one form of structure to another without any hiatus, so that it becomes a mere matter of opinion whether the so-called genera into which they are to be classed shall be many or few. Nature draws no line by which the rank or extent of genera can be determined. As a general rule, varieties of *form* are considered to constitute genera, and varieties of colour, species; but this criterion is far from infallible, for we very rarely find two species, however closely allied, possessing precisely the same form and proportions; so that if every difference of structure be held to be generic, we shall end in having as many genera as

there are species. Take, for instance, the two very natural groups *Corvus* and *Parus*, as now restricted; it will be found on examination that there are marked differences of both structure and habits which characterize almost every one of the species. It is plain then that we have in general no other guide in the definition of new genera than a mere *opinion* as to the amount of structural variation which is considered to authorize their adoption, and I think there can be no doubt that in many of the genera recently established in ornithology, the standard has been reduced too low; in other words, these genera are based on diversities of structure of so little value as to be practically inconvenient. All genera profess to be of equal rank, and we should therefore aim at making them as nearly so as possible, and at the same time not inconveniently numerous.

“Granting, however, that many of the existing genera of birds are based on insufficient characters, and may require to be reincorporated with the groups from which they have been divided, it is equally certain that other groups exist in our cabinets, whose characters, as yet undefined, are so marked, as to demand in fairness, and with the view of producing equality of rank, to be defined and named as genera. A few of these groups I now bring forward, illustrated by specimens from my own cabinet, and the meeting will be able to judge how far the structures here exhibited appear to authorize generic distinction.

“I also take this opportunity of exhibiting a specimen of that rare bird the *Glyphorhynchus cuneatus* (Licht.), afterwards named *Xenophasia platyrhyncha* by Mr. Swainson. This bird has the tail of *Dendrocolaptes* and the general form of *Xenops*, while the beak is altogether anomalous, being compressed at the sides and depressed at the apex.”

Fam. SYLVIADÆ.

Subfam. MALURINÆ.

GENUS SPHENÆACUS*, n. g.

< *Motacilla*, Gm., < *Malurus*, Sw., < *Sphenura*, Licht.

Diff. Char.—Beak much compressed; tail cuneate.

Rostrum mediocre, compressum, ad basin elevatum, culmine subrecto, juxta apicem deorsum, gonyde pariter sursum curvato, tomio maxillari emarginato, commissurâ leviter deflexâ. Nares oblongæ, membranâ suprâ tectæ. Vibrissæ nullæ.

Alæ breves rotundatæ, remigibus 4â, 5â, 6â, 7â, æqualibus, primam duplo excedentibus.

Cauda longiuscula, maximè cuneata, reatricibus strictis, acutis, subdecompositis, intermediis exteriores triplò superantibus.

Pedes fortes, tarsi longiusculis, acrotarsiis scutellatis, paratarsiis integris, digitis lateralibus æqualibus.

Ungues modicè curvati, acuti.

Pltilosis rigida, pennis subdecompositis.

Habitat in Africâ.

Species unica, *S. Africanus* (Gm.), Levaill. Ois. d’Af., pl. 112. f. 2. (*Sphenura tibicen*, Licht.)

* Σφήν, a wedge; οἶαξ, a helm.

Fam. MUSCICAPIDÆ.

Subfam. FLUVICOLINÆ.

Genus COPURUS*, n. g.

< *Platyrhynchus*, Spix, < *Muscipeta*, Cuv.Diff. Char.—*The two medial rectrices greatly prolonged.*

Rostrum triangulare (desuper spectanti) paulo longius quàm latum, modicè depressum. Culmen rotundatus, ad basin lentè, versus apicem citiùs decurvans. Nares ovatæ, patulæ. Tomia maxillaria modicè emarginata. Commissura leniter decurvata, gonyis leniter ascendens. Vibrissæ rictales mediocres.

Alæ longiusculæ, remige primâ brevior, 2â, 3â, 4â, fere æqualibus.

Cauda mediocris, quadrata, nisi quòd maris rectrices duæ intermediae graciles spathuliformes reliquas magis duplo excedunt.

Tarsi mediocres, acrotarsiis paratarsiisque scutellatis. Digitus externus interno longior, ad basin paulò cum intermedio coadunatus. Ungues longiusculi, satis curvati, acuti, graciles.

Habitat in Americâ Meridionali.

Species unica, *C. flicaudus* (Spix), Av. Braz. v. 2. pl. 14. (*Muscicapa leucocilla*, Hahn.)

Obs. This bird bears much resemblance to *Pipra* in the colours of its plumage and in the elongate rectrices, as Mr. Swainson has remarked (Classif. Birds, v. ii. p. 90). The depressed beak, however, rounded culmen, shorter tarsus, and slender claws, sufficiently prove its true place to be among the Flycatchers, near *Alectrurus*.

Fam. PIPRIDÆ?

Subfam. PARDALOTINÆ?

Genus PRIONOCHILUS†, n. g.

< *Pardalotus*, Temm.Diff. Char.—*Margins of the beak minutely serrated.*

Rostrum longiusculum, subcompressum, mandibulis subæqualibus; culmine subcarinato, juxta basin recto, deinde usque ad apicem gradatim decurvato; commissurâ modice decurvata; gonyde sursum curvata. Maxilla haud emarginata, sed tomia mandibulæ utriusque per medietatem externam minutissimè serrata. Nares oblongæ, membranâ suprâ tectæ.

Alæ mediocres, remige 1â spuriâ, 3â, 4â, et 5â subæqualibus.

Cauda brevis, rectricibus æqualibus.

Pedes subbreves, gressorii, acrotarsiis subscutellatis, paratarsiis integris. Digitus externus interiore longior, ad medium per longitudinis dimidium coadunatus.

Habitant in Malasiâ.

Species: 1. *P. percussus* (Temm.), Pl. Col. 394. f. 2. 2. *P. thoracicus* (Temm.), Pl. Col. 600. f. 1, 2. 3. *P. maculatus* (Temm.), Pl. Col. 600. f. 3.

Obs. The nearest affinity of this group is *Calyptomena*, Raff., to which it approaches in the structure of the beak and feet much more

* Κώπη, an oar; οὐρά, the tail.

† Πρίων, a saw; χείλος, a lip.

nearly than to *Pardalotus*. The serrations of the *tomia* appear not to have been hitherto noticed.

Fam. LANIADÆ ?

Subfam. ————— ?

Genus ÆTHIOPS*, n. g.

Diff. Char.—*Beak subconical, slightly emarginate, dilated at the base. Rostrum* subconicum, subelongatum. Maxilla ad basin paulo dilatata, juxta apicem compressa, leviter emarginata, apice paulo deorsum curvato, tomiis inflexis. Culmen subcarinatus, gradatim à basi ad apicem decurvatus. Nares ovatæ. Commissura leviter decurvata, gony ascendens.

Alæ mediocres, rotundatæ, remige 1^a spuriâ, 3^a, 4^a, et 5^a subæqualibus. *Cauda* breviuscula, rotundata.

Tarsi breves, acrotarsiis scutellatis, paratarsiis integris. *Digiti* mediocres, medius tarsum æquans, postico longior; externus internum paulo superans. Ungues breviusculi, modicè curvati, ad latera sulcati.

Habitat in Africâ occidentali. Species unica.

ÆTHIOPS CANICAPILLUS. *Æth.* vertice, cervice, dorsoque canescente-cinereis, verticis lateribus, uropygioque canescente-albidis. Fronte, genis, gula, partibusque inferioribus omnibus nigerrimis. *Alæ* nigra, tectricibus minoribus omnibus, majoribusque dorso proximis maculâ subapicali rotundatâ albâ. *Cauda* unicolor nigra, tectricibus superioribus nigrescente-plumbeis. *Rostrum* pedesque nigri.

Long. tot. 5 poll. *Rostrum* ad rictum 7½ lin., ad frontem 6 lin., latum 3½ lin., altum 3 lin. *Ala* 2 poll. 8 lin. Rectrices medii 1 poll. 11 lin., externi 1 poll. 7 lin. *Tarsus* 8 lin. *Digitus* intermedius cum ungue 8 lin., externus 6 lin., internus 5½ lin., posticus 6 lin.

Hab. in insulâ Fernando Po. Mus. meo.

Obs. This singular generic form is very difficult to classify. The beak is somewhat similar in form to that of a Tanager, but its other characters and the African habitat forbid such a collocation. The beak also exhibits some resemblance to that of *Artamus*, but the shortness of the wings makes a marked contrast to that genus.

Fam. FRINGILLIDÆ.

Subfam. TANAGRINÆ.

Genus STEPHANOPHORUS†, n. g.

< *Tanagra*, Tem., < *Pyrrhula*, Vieill.

Diff. Char.—*Beak very short, tumid, of equal height and length.*

Rostrum breve, subconicum, mandibulis subæqualibus, intumidis; culmine gradatim deorsum, gonyde sursum incurvatis; commissurâ subrectâ, leviter deorsum curvatâ; maxillâ juxta apicem obsoletissimè emarginatâ. Nares subrotundæ.

Alæ mediocres, rotundatæ, remigibus 3^a, 4^a (hâc longissimâ) et 5^a ferè æqualibus.

* Λιθίον, a negro, in reference to the colour and habitat.

† Στέφανος, a crown; φέρω, to bear.

Cauda mediocris, reatricibus subæqualibus.

Pedes mediocres, acrotarsiis scutellatis, paratarsiis integris. Digitus externus interiorem paulo excedens. Ungues mediocres, leviter curvati.

Ptilosis cærulescens, nitore sericeo. Vertex colore igneo insignis.

Habitat in Americâ meridionali.

Species unica, *S. cæruleus* (Vieill.), (*T. diadema*, Temm.), Pl. Col. 243.

Obs. The beak is more tumid and the under mandible more developed in this well-marked type than in any other of the *Tanagrinae*, and it has hence been referred to the genus *Pyrrhula*. The marginal notch, however, together with the blue and silky plumage, and the geographical distribution, sufficiently prove the true place of this bird to be among the Tanagers, and in the vicinity of *Tanagra*, Lin. (restr.), and *Calospiza*, Gray (*Aglaiia*, Sw.).

Fam. PICIDÆ.

Subfam. CELEINÆ.

The genus *Brachylophus*, as defined by Mr. Swainson, includes three very distinct groups: first, the Green Woodpeckers, which had previously been named *Gecinus* by Boié; secondly, the crimson-winged species, *miniatus*, *puniceus*, and *mentalis*, to which I propose to restrict Swainson's name *Brachylophus*; and thirdly, the short-thumbed Woodpeckers, which are here characterized.

GENUS BRACHYPTERNUS*, n. g.

< *Picus*, Linn., < *Brachylophus*, Sw.

Diff. Char.—*Hind toe and claw very short, almost obsolete.*

Rostrum longitudine caput æquans, apice obtusè securiformi, culmine paulatim decurvato, acie laterali nullâ, commissurâ rectissimâ, gonyde paulo ascendente.

Alæ mediocres, remige 1â subspuriâ, 4â, 5â (hâc omnium longissimâ) et 6â subæqualibus.

Cauda mediocris.

Tarsus mediocris. *Digitus* intermedius ac versatilis tarsum æquiparantes, posticus cum ungue brevissimus, propemodum obsoletus.

Ptilosis dorsum alæque aurantia aut rubra, facies et partes inferiores albido nigroque variegatæ.

Habitant in Indiâ, Malasiâ.

Species: 1. *B. aurantius* (Linn.), (*P. bengalensis*, Gm.; *P. nuchalis*, Wagl.; *B. hemipodius*, Sw.). 2. *B. goensis* (Gm.), (*P. peralaimus*, Wagl.). 3. *B. philippinarum* (Lath.), (*B. palalacca*, Wagl.). 4. *B. hæmatribon* (Wagl.). 5. *B. erythronotus* (Vieill.), (*P. neglectus* Wagl.).

Fam. CHARADRIADÆ.

Subfam. CHARADRIANÆ.

The group of Plovers affords an instance in addition to those furnished by the genera *Ceyx*, *Alcyone*, *Jacamaralcyon*, *Tiga*, *Tridactylia*,

* Βραχὺς, short; πτέρνα, a heel.

Halodroma, and others, that the presence or absence of the hind-toe in birds becomes, under certain circumstances, a character of very small value in the natural arrangement. The fact seems to be, that when in any group the hind-toe becomes so slightly developed as to be unable to perform those functions of prehension or of progression which are its usual duties, the transition from the abortive state of this organ to its total disappearance becomes very unimportant. In the group of the Plovers too much weight has hitherto been attached to the presence or absence of the hind-toe; it has been made the groundwork of divisions into families and subfamilies, whereas the utmost value that can justly be assigned to it amounts only to that of a generic character. This is proved by the fact that the absence of the hind-toe is not coincident with the other and more extensive changes of structure in the group, so that it becomes indicative of analogy rather than of affinity, as the following table of the genera of *Charadrianae* will show:—

A. Acrotarsia reticulate, wings pointed, plumage spotted.

Three-toed *Charadrius*.

Four-toed *Squatarola*.

B. Acrotarsia reticulate, wings pointed, plumage black, white, and grey, in large masses.

Three-toed *Eudromias*. *Hiaticula*.

C. Acrotarsia scutate, wings rounded, plumage black, white, and grey, in large masses.

I. Face unwattled.

Three-toed. <i>Philomachus</i> , Mœhr. (<i>Hoplopterus</i> , Bon.)	{	a. wing-spine short, <i>P. coronatus</i> (Gm.).
			b. wing-spine long, <i>P. spinosus</i> (Linn.).

Four-toed <i>Vanellus</i> , Temm.	{	a. wing-spine short, <i>V. cristatus</i> (Linn.).
			b. wing-spine long, <i>V. cayennensis</i> (Gm.).

II. Face wattled.

Three-toed *Sarciophorus*, mihi.

Four-toed *Lobivanellus*, mihi.

The last two groups which have hitherto been united, the one with *Charadrius*, the other with *Vanellus*, are now for the first time defined.

Genus SARCIOPHORUS*, n. g.

< *Charadrius*, Gm.

Diff. Char.—*Three-toed, lores wattled.*

Rostrum ut in *Charadriis*.

Membrana loris affixa, nuda, erecta, in anticum protensa.

Alae elongatae, caudam vix superantes, remigibus tribus primariis subaequalibus. *Spina pollicaris* brevis, obtusa.

Cauda modicae longitudinis, rectricibus aequalibus.

* Σαρκίον, a caruncle; φέρω, to bear.

Pedes elongati, graciles, tridactyli, acrotarsiis scutellatis.

Habitant in Africâ, Asiâ, Australiâ.

Species: 1. *S. pileatus* (Gm.), Pl. Enl. 834. 2. *S. tricolor* (Vieill.), (*Charadrius pectoralis*, Wagl.). 3. *S. bilobus* (Gm.), Pl. Enl. 880.

GENUS LOBIVANELLUS*, n. g.

< *Parra*, Gm., < *Tringa*, Lath., < *Charadrius*, Wagl., < *Vanellus*, Cuv.

Diff. Char.—*Four-toed, lores wattled.*

Rostrum ut in *Charadriis*.

Membrana loris affixa, nuda, erecta, in anticum protensa.

Alæ elongatæ, caudam vix superantes, remigibus tribus primariis subæqualibus. *Spina pollicaris valida, acuta.* *Cauda* modicæ longitudinis, *rectricibus æqualibus.*

Pedes elongati, graciles, tetradactyli, acrotarsiis scutellatis.

Habitant in Africâ, Asiâ, Australiâ (Americâ?).

Species: 1. *L. goensis* (Gm.), Pl. Enl. 807. 2. *L. gallinaceus* (Wagl.), Jard. Ill. Orn. ser. 1. pl. 84. 3. *L. ludovicianus* (Gm.), Pl. Enl. 835. 4. *L. senegalus* (Linn.), Pl. Enl. 362. 5. *L. albicapillus* (Vieill.), Sw. W. Af. v. ii. pl. 27. 6. *L. tricolor* (Horsf.), (*Ch. macropterus*, Wagl.). 7. *L. dominica* (Gm.), (*Ch. brissonii*, Wagl.). 8. *L. albiceps* (Gould), Proc. Zool. Soc. pt. ii. p. 45. 9. *L. cucullatus* (Temm.), Pl. Col. 505.

The Secretary called the attention of the members to a new species of Monkey, allied to the green *Cercopithecus*, living at the Society's Menagerie.

The Monkeys allied to *Cercopithecus sabæus*, observes Mr. Ogilby, are now so numerous, that they may be considered to form a sub-genus of themselves, at least for all the practical purposes of descriptive zoology. Four species have been already distinguished by M. Frederic Cuvier, *C. sabæus*, *faunus*, *griseus*, and *pygarythrus*. Colonel Sykes has described a fifth, *C. alboqularis*, though it is certainly less closely allied to the others than they are among themselves; and there is now a fifth living in the Gardens. This species is most nearly related to *C. sabæus* and *pygarythrus*, between which it is intermediate in many of its characters. It may be described as follows:—

CERCOPITHECUS TANTALUS. *Cerc. suprâ saturatè flavo-viridis, in artus cinerescens, subtus stramineus; facie subnigrâ, circa oculos lividâ; auriculis palmisque fuscis; caudâ fuscâ; apice caudæ, mystacibus et perinæo flavis; tenid frontali albd.*

Head, back and sides a mixture of yellowish brown and green, of the same intense shade as that which prevails on the upper parts of the allied species, *C. sabæus* and *pygarythrus*; outer surface of the limbs of a clearer ashy grey colour; whiskers, throat, breast, belly, and inside of the limbs yellowish white; tail brown at the root, light grey at the tip; backs of the hands and feet light grey; face covered with very short hairs, black on the nose and cheeks, livid flesh-colour

* *Lobus*, a caruncle; *vanellus*, a Lapwing.

round the eyes, and light brown on the lips; eyebrows black, surmounted by a broad white fillet which passes across the forehead; nose very prominent and narrow between the eyes, but flatter and broader towards the extremity; ears and palms of the hands brown; scrotum surrounded by yellowish hairs; size and form of *C. sabæus*, but with a rounder head and shorter face.

The specimen here described was procured at Liverpool, but its previous origin is unknown.

A paper, in which Mr. Broderip proceeds with his descriptions of Mr. Cuming's shells, was next read.

HELIX REEVII. *Hel. testâ ovato-subpyramidalî, anfractibus 5 ventricosis, lineis incrementi creberrimè obliquè striatis, ultimo maximo, cæteris duplò longiori, apice subplano, umbilico vix apparente, columellâ robustâ basi subsinuatâ, labii limbo reflexo, aperturâ cæruleo-albâ.*

Long. 3; lat. $2\frac{3}{8}$ poll.

Var. *a.* *Rubro-brunnea, epidermide ex albo brunnescente obtecta, fasciis latis nigricantibus insignis.*

Var. *b.* *Lineis fasciisque nigricantibus numerosis cincta.*

Hab. ad Luchban in Tayabas insulæ Luzon.

Legit H. Cuming in sylvis.

Var. *c.* *Tota rubro-brunnea anfractu basali nigrescente.*

Hab. ad Tayabas insulæ Luzon.

Legit H. Cuming in sylvis.

This fine *Helix*, named, at the request of Mr. Cuming, after Mr. Reeve, an assiduous collector, was found by the former at the localities above mentioned, adhering to the leaves of trees. The ground-colour is reddish brown, deepening on the body-whorl to rich, dark plum-colour, approaching to black. A brownish white *epidermis* covers the two first varieties, with the exception of certain intervals, through which the ground-colour is exposed in the form of lines and bands. Thus in var. *a.* three small cinctures of brown lines appear towards the upper part, and a broad brown band at the lower part of the fourth whorl. At the upper part of the body-whorl are two hair-like dark lines, and the middle and lower part of it is belted with four bold, broad, nearly black bands. In var. *b.* the body-whorl is belted and filleted with more numerous lines and bands, but none of the latter are so broad as they are in var. *a.* In all the varieties the *peritreme* and reflected lip are of a rich plum-colour, and the inside of the aperture is bluish white. The pattern resides in the *epidermis*, and, when the shell is plunged into water, disappears.

BULINUS ONYX. *Bul. testâ subpupiformi, umbilicatâ, lineis incrementi obliquis creberrimè substriatâ, anfractibus 7, ultimo maximo; anfractibus 4 primis sordidè albis, quinto et sexto castaneis, ultimo supernè castaneo, basi albo, labii reflexi margine lato et columellâ nigricantibus, aperturâ albâ.*

Long. $2\frac{1}{2}$; lat. $1\frac{1}{8}$ poll.

Hab. ad Calanang insulæ Luzon.

Legit H. Cuming in sylvis.

The above description is taken from a shell deprived of its *epidermis*, and I have only seen one with the *epidermis* on, and that one is not in good condition. The *epidermis* is dirty white. On the anterior part of the fourth whorl a band of longitudinal brown dashes, occurring at regular intervals, extends far upon the whorl from near the suture. A similar band skirts the anterior part of the body-whorl, which is belted with two whitish bands, the uppermost rather below the middle, and is greenish at the base. Upon plunging the shell into water the upper *epidermis* disappears, and exposes the ground-colour; but the greenish *epidermis* remains unchanged. The aperture of the shell almost looks as if it had been curtailed artificially, so suddenly does it terminate.

BULINUS ALBERTI. *Bul. testá pyramidalí, anfractibus sex, lineis incrementi obliquè creberrimè striatá, anfractu ultimo cæteros vix æquante, apice acuto, rubro-brunneo, basi viridi; columellá subsinuátá et labii reflexi margine nigricantibus; aperturá albá.*

Long. $2\frac{6}{8}$; lat. $1\frac{6}{8}$ poll.

Var. *a.* *Strigis angulatis albidis et nigricantibus concinnè marmorata; anfractu basali fasciis 2 subalbidis cincto.*

Hab. ad montem Isarog insulæ Luzon.

Legit H. Cuming in sylvis.

Var. *b.* *Obscurior; anfractu quinto albido supernè unifasciato, anfractu basali albido trifasciato.*

Hab. ad Calanang insulæ Luzon.

Legit H. Cuming in sylvis.

This species, the most elegant of all the *Bulini* which I have yet seen, is named in honour of His Royal Highness Prince Albert. The form and rich but elegant colouring of the shell combine to make it very beautiful. The pattern, as in the two last species, resides in the *epidermis*, and, when the shell is plunged into water, disappears; but the green at the base remains unchanged, as in the last species.

Mr. Cuming found var. *a.* on the leaves of trees in the woods at the foot of Mount Isarog, in the province of South Camarines, at the south-east end of Luzon. It was very rare, for Mr. Cuming, after a search of many days, could only procure six specimens.

Var. *b.* was found in dense woods, also on the leaves of trees, in the province of the Laguna, at Calanang, in that island.—W. J. B.

April 27.—William Horton Lloyd, Esq., in the Chair.

The exhibition was resumed of the new species of Shells collected by H. Cuming, Esq. in the Philippine Islands, and the following description of new species, by W. J. Broderip, Esq., was read.

HELIX (CAROCOLLA) REGINÆ. *Car. testá hyaliná, prasiná, lineis incrementi obliquè striatá, lineolis transversis creberrimè decussatá suberectá, anticè compressá; anfractibus 3, ultimo latissimo, acuto, suturam versus concinnè cælato; aperturá infrá angulatá; labii margine subexpanso, acuto.*

Long. $\frac{4}{8}$; lat. $1\frac{1}{8}$ poll.

Hab. ad Sibongam Insulæ Zebu foliis arborum hærens, rarissima.

Legit H. Cuming in sylvis.

This rare *Carocolla* excels in beauty and delicacy all the land-shells that I have yet seen. Green is by no means a common colour in the testaceous mollusca generally; but in the pulmoniferous testaceans it is comparatively rare, and, in the cases where it occurs, generally resides in the *epidermis*, or forms a part of the pattern. But this elegant species, of a delicate transparent green, somewhat between the colour of an emerald and a chrysopræse, is more like a gem than a shell. It does not lie flat like most of the *Carocollæ*, but when placed with its aperture downwards, stands at a high angle. A light-coloured line marks the suture and the edge of the body-whorl, while the expansion of the lip (which expansion terminates at the angle of the aperture) is of a glassy clearness. On the under part of the shell, especially, the striæ formed by the lines of growth are crossed by other delicate and very frequent transverse lineations.

Var. *a.* *Anfractus basalis angulo brunneo lineatus.*

The animal of both varieties is grayish white.

Hab. ad Puerto Galero insulæ Mindoro foliis arborum hærens.

Legit H. Cuming in sylvis.

HELIX (CAROCOLLA) PAPHYRACEA. *Car. testâ albo-flavescente, diaphanâ, lineis incrementi obliquè creberrimè striatâ; columellâ crassâ, excavatâ, latâ et elongatâ; labii limbo vix expanso.*

Long. $\frac{1}{2}$; lat. 1 poll.

Though this *Carocolla* may at first sight be taken for a variety of *Car. Reginae*—and such was my original impression—a nearer inspection will detect the distinction between the shells. The spire in *Car. papyracea* is more elevated, and the shell stands at a higher angle; the expansion of the lip is not so wide, and it is not terminated at about half the distance from the outer edge to the columella (as it is in *Car. Reginae*), but continues until it forms a slight angle below the columella. In *Car. papyracea* the edge of the expanded lip is the lowest part of the shell, whereas in *Car. Reginae* the white continuous edge of the columellar lip is placed above a green portion of the base of the volution, which is prominent below it; the columella is also quite different; and these distinctions cannot be attributed to difference of age, for the most complete specimens of each which have furnished the comparison are full-grown.

Hab. ad Puerto Galero in insulâ Mindoro foliis arborum hærens.

Legit H. Cuming in sylvis.

HELIX (CAROCOLLA) DRYOPE. *Car. testâ subdiaphanâ, subpyramidali, lineis incrementi creberrimè striatâ et striis transversis levibus frequentissimè decussatâ; anfractibus 4, ultimo maximo acuto, ex albido virescente; apice, labii limbo, et umbilico nigro-castaneis; aperturâ auriculiformi, intùs iridescente.*

Long. $\frac{5}{8}$; lat. 1 poll.

Hab. ad St. Juan in provinciâ Cagayan insulæ Luzon, foliis arborum hærens.

Legit H. Cuming in sylvis.

The sculpture of this species resembles that of *Car. Reginae*, but
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there the similitude ends. The termination of the aperture is below the line of the body-whorl. The shell consequently rests more on its base: it is much more opaque than *Car. Reginae*, and has no angle at the aperture, the inside of which has the iridescence of mother of pearl. The sharp edge of the body-whorl is light yellow.

Var. *a. Planior albido- et luteo-virescens; anfractu basali maculis albidis obscuris guttato; basi flavescente; labii limbo ex albido flavescente.*

Hab. ad insulam Bureas, foliis arborum parvorum hærens.

Legit H. Cuming in sylvis.

In this variety, which is much flatter, the sharp edge of the body-whorl is whitish.

HELIX (CAROCOLLA) LISTERI. *Car. testâ complanatâ, umbilicatâ; anfractibus 4, lineis incrementi creberrimè striatis, ultimo maximo acuto; albido-fuscâ maculis brunneis guttatâ, et brunneo uni-fasciatâ; peritremate deorsùm flexo auriculari, albido; labii unidentati margine acuto, anticè lanceolato.*

Long. $\frac{5}{8}$; lat. $1\frac{1}{8}$ poll.

Hab. ad Albay insulæ Luzon, truncis arborum hærens.

Legit H. Cuming in sylvis.

Mr. Cuming had named this species *Car. Gallina*; but as it is designated as *Car. Listeri* on the boards of the British Museum, and as Lister appears to have been the first who figured it, but apparently from an imperfect shell, the latter name is retained.

In colour and in the direction of the form and shape of the aperture it bears much resemblance to *Helix auriculata*, figured by Mr. Swainson (Zoological Illustrations, 1st series) from a specimen formerly in the cabinet of Mr. C. Dubois, afterwards in mine, and now in the British Museum; but in *H. auriculata* the whorls are comparatively rounded, and the body-whorl is quite round instead of having a sharp edge. *H. auriculata* is besides, in many individuals, dimpled with small depressions. These differences may be sufficient in the present state of our knowledge to constitute specific distinction; but whether they are in reality strong enough to form such a separation, may well be doubted. My present impression is, that *H. auriculata* and *H. Listeri* are identical; but I shall return to this subject when I have examined the whole of the cognate series in Mr. Cuming's collection.

HELIX (CAROCOLLA) PARMULA. *Car. testâ valdè complanatâ, umbilicatâ; anfractibus 4, lineis incrementi striatis, ultimo maximo, acuto; fuscâ, lineâ brunneâ suturam juxta albam fasciatâ, margine anfractûs ultimi acuto, albo; peritremate deorsùm flexo auriculari; labii anticè sublancoolati subalbidi margine subreflexo.*

Long. $\frac{3}{8}$; lat. $\frac{1}{2}$ poll.

Hab. ad Argao insulæ Zebu, arborum excelsorum truncis hærens.

Legit H. Cuming in sylvis.

This is a delicate though not showy species.

Var. *a. Elevatior, obscurè albens fasciâ suturali et centrali fuscâ ornata.*

Hab. ad insulam Negros, truncis arborum hærens.

Legit H. Cuming in sylvis.

HELIX (CAROCOLLA) SIQUIJORENSIS. *Car. testá subcomplanatá anfractibus 4, lineis incrementi creberrimè striatá; ultimo maximo, acuto; labii subreflexi limbo superiore haud deorsùm depresso; fuscá, epidermide cinerascete coopertá.*

Long. $\frac{5}{8}$; lat. $1\frac{6}{8}$ poll.

Hab. ad radices arborum et arbusculorum in insulá Siquijor.

Legit H. Cuming in sylvis.

The ash-coloured *epidermis* which covers this species, upon immersion in water, disappears, to reappear when it is dry. When it is wet the dark brown ground-colour is exposed. The shell varies to a lighter whitish-brown hue. The sutural line is darker than the general colour, and the lower surface of the expanded edge of the lip is dark brown and shining in each variety. The termination of the upper edge of the lip is on the same line with the edge of the body-whorl.

HELIX (CAROCOLLA) THERSITES. *Car. testá subcomplanatá, gibbá, tenuissimá, hyaliná, diaphaná; anfractibus 4, lineis incrementi creberrimè striatis, ultimo anticè acuto, posticè subitò rotundato, gibbo; aperturá magná; labii anticè reflexi limbo subreflexo, flavescete; anfractibus suturam versus et medio castaneo-fasciatis; nucleo castaneo.*

Long. $\frac{1}{2}$; $1\frac{3}{8}$ poll.

Hab. ad Calopan in insulá Mindoro, foliis arborum hærens.

Legit H. Cuming in sylvis.

The deformed appearance of this species arises from the flattened and sharp edge of the body-whorl suddenly becoming rounded at about half way. The colouring is pretty, the chestnut bands showing to advantage on the transparent amber-colour of the shell. The young shell has no gibbosity.

Var. *a. Subdiaphana, fasciá latissimá nigro-castaneá ornata.*

Hab. cum præcedente.

This variety is more opaque, and the broad, blackish, chestnut band extends from the suture half-way down the whorls. The base of the shell is broadly bifasciated with the same dark colours, the narrowest band being nearest to the outside edge. The termination of the lip in this species is on the same line with the body-whorl.—W. J. B.

The next paper read was by G. B. Sowerby, Esq. This also consists of descriptions of Mr. Cuming's new species of shells.

HELIX MODESTA. *Hel. testá acuminato-subovali, tenui, albicante, fasciis spiralibus badiis modestè ornata; spirá acuminatusculá, apice obtuso; anfractibus $4\frac{1}{2}$ subrotundatis, lævibus, lineis incrementi tenerrimè insculptis, ultimo maximo, ventricoso; suturá distinctá; aperturæ margine externo rotundato, interno supernè anfractu penultimo modificato; columellari recto, angulum efformante; peristomate paululùm reflexo, badio; columellá rectá, albá, subincrassatá.*

Long. 1·1 ; lat. 0·8 poll.

Hab. supra folia arborum, propè Catanauan provinciæ Tayabas insulæ Luzon, Philippinarum.

An extremely rare species, rather remarkable among its gay associates of the Philippine Islands for its unpretending modesty of colouring, as well as for its neat contour.

HELIX PYRAMIDALIS. *Hel. testâ oblongo-pyramidali, brunneâ, crassiusculâ; apice obtuso, saturatiore; fasciâ suturali nigro-brunneâ nonnunquam ornatâ; spirâ acuminatâ; anfractibus 5½, leviter rotundatis, lævibus, lineis incrementi tenerrimè insculptis, ultimo majori, rotundato; aperturæ margine externo rotundato, interno supernè anfractu penultimo modificato; columellari recto, angulum efformante; peristomate reflexo, subincrassato, brunneo; columellâ rectâ, crassiusculâ, albâ.*

Long. 1·5 ; lat. 0·8 poll.

Hab. supra folia arborum, ad insulam Cuyo, Philippinarum.

This species most nearly resembles our *Helix incompta*, but may be easily distinguished by its proportions, the number of volutions, and its longer, more pyramidal spire.

HELIX ACUMINATA. *Hel. testâ acuminato-pyramidali, brunneâ, nigrâ, crassiusculâ; apice obtusiusculo, pallidiore, spirâ acuminato; anfractibus 5, planulatis, lævibus, nitidis, lineis incrementi tenerrimè insculptis, ultimo majori, medianè subangulato; aperturâ anticè subeffusâ; peristomate externo subincrassato, reflexo, brunnescente-nigro; columellâ albâ, subincrassatâ, subdeclivi.*

Long. 1·3 ; lat. 0·8 poll.

Hab. supra folia arborum ad insulam Cuyo, Philippinarum.

Two specimens only of this species have been found; it somewhat resembles the last, but may be known from that by its more acuminate shorter spire, and by the sides of the volutions being nearly straight, and not rounded. Remains of an opaque hydrophanous epidermis are to be seen on both the specimens.

HELIX OBLONGA. *Hel. testâ oblongâ, subcylindricâ, tenui, brunneâ, obscurâ, subrugosâ; anfractibus senis, latis, ventricosis, ultimo majori; suturâ distinctâ; aperturâ subovali, posticè anfractu ultimo modificato; peristomate amplo, subincrassato, reflexo; columellâ albâ, subincrassatâ, rectiusculâ; umbilico mediocri.*

Long. 1·5 ; lat. 0·75 poll.

Hab. supra folia arborum, ad insulam Luban, Philippinarum.

Somewhat like *H. Oomorpha*, but distinguished easily by its proportions, by the number of its volutions, and by the nature of its peritreme.

HELIX FRAGILIS. *Hel. testâ subglobosâ, tenuissimâ, lævi, viridescente; anfractibus tribus, raptim crescentibus, ultimo maximo, lineis interruptis fasciisque duabus anticis albis; aperturâ magnâ; peristomate tenui, subreflexo; columellâ tenui, rectiusculâ.*

Long. 1· ; lat. 1·15 poll.

Hab. supra folia arborum, prope Tanauan ad insulam Leyte, Philippinarum.

One of the most delicate and fragile of the Helices, which in general form somewhat resembles our common *Helix aspersa*; the white interrupted lines, as well as the two white bands, consist of hydropneumatic epidermal matter.

HELIX BRUNNEA. *Hel. testâ subglobosâ, crassiusculâ, lævi, obscurâ, brunneâ, albido nigroque fasciatâ; spirâ brevi, obtusâ; anfractibus quatuor, subrotundatis, ultimo maximo, ventricosos; aperturâ latè semilunari; peristomate nigro, subexpanso, crassiusculo, reflexo; labio columellari lato, albo; columellâ declivi, incrassatâ, albâ.*

Long. 1·3; lat. 1·7 poll.

Hab. supra folia arborum, prope Puerto Galero ad insulam Mindoro dictam, Philippinarum.

Usually of a rich brown colour, the circumference having a black band posteriorly, and a whitish band anteriorly, in front of which there are several whitish and brown bands alternately: the circumference of the columellar lip is nearly black.

May 25.—William Yarrell, Esq., Vice-President, in the Chair.

A letter was read from the Society's Corresponding Member, J. M'Clelland, Esq. It states that several Birds and Quadrupeds had been forwarded from India for the Society's Menagerie, and likewise that Mr. M'Clelland had sent a collection of the rarer Indian fresh-water fishes for the Museum.

Some notes, from Sir Robert Heron, Bart., were next read. These notes relate to the breeding of Gold-fishes in the author's menagerie. Sir R. Heron observes, that about two out of five of the specimens hatched are deficient of the dorsal fin, and about two in a hundred, or rather more, have a triple tail-fin, and as many have the anal fin double. All the deformed fishes are separated from the others and placed in a pond by themselves, but they do not produce a greater proportion of deformed offspring than the perfect fishes.

The following paper, by George Gulliver, Esq., F.R.S., entitled "Observations on the Blood-corpuscles of the order *Feræ*," was then read.

"It appears to me that a systematic and comprehensive set of observations is yet wanting on the blood-corpuscles of the different orders of the class Mammalia, for the subject is interesting in connexion with physiological questions now perpetually arising, and which may be expected to multiply as inquiries in minute anatomy are extended.

"In the order *Feræ* the result of my observations will show that the size of the blood-discs has a general relation to the different families. Although some exceptions may appear, these will probably fall into order as our knowledge of the subject becomes more complete; and it must be recollected that zoologists differ as to the exact affinities of a few of the animals in question.

"In the *Insectivora* the size of the corpuscles is considerably smaller than in the *Plantigrada*. The corpuscles of this latter family are very uniform in size, and, as far as I have at present observed, larger than those of the other species of the *Feræ*, with the

exceptions afforded by the genera *Canis*, *Lycaon*, *Hyæna*, *Lutra*, and *Phoca*. The corpuscles of the common species of the two latter, and of the Dog, are the largest I have yet found in the order. The most minute corpuscles of the *Feræ* were also found in the family *Carnivora*. In the *Viverridæ* and *Felidæ* the corpuscles appear to be very small, as compared with those of the *Phocidæ* and *Canidæ*; and in the genera *Paradoxurus* and *Herpestes* the corpuscles are, for the most part, remarkably so, especially in the *Paradoxurus Bondar**, in which animal they only slightly exceed those of the Goat in size, as noticed in the 'Proceedings of the Society,' Nov. 24, 1840. Among the Cats there is a great resemblance of the corpuscles, which are only just appreciably larger in the Lion, Tiger, Chetah, and Leopard, than in the domestic Cat, so that it would require a nice observation to detect any difference. In the Serval and Norway Lynx, the corpuscles, obtained after death from the heart, appeared to be fully as large as those of any other species of the genus; the corpuscles of the Ocelot and Persian Lynx presenting the smallest size. But as the blood was obtained from the two last species during life, the observations were not quite satisfactory for comparison, as the corpuscles soon undergo changes after death†, and are very liable to certain alterations quickly after being abstracted even from the living animal‡. In the Dog they were uniformly found to be slightly larger than in the Fox and some other congenerous species; and in the Striped and Spotted Hyænas the corpuscles closely resemble those of the genus *Canis*, and are therefore distinctly larger than in the *Viverridæ* and *Felidæ*, with both of which the Hyæna has been associated. The corpuscles of the *Bassaris* approximate pretty nearly to those of the *Ursidæ*.

"On the whole then, although there is considerable diversity in the magnitude of the red particles of the order, there is generally a well-marked relation between these and the different families. Thus the blood-corpuscles of the *Plantigrada* may be immediately distinguished from those of the *Viverridæ*. Adopting Mr. Waterhouse's subdivisions of the *Carnivora*, they would stand as follows, if set down in the order of the size of their blood-discs:—Seals, Dogs, Bears, Weasels, Cats, Viverras. The difference in size is generally quite distinct between the corpuscles of the first two and last two tribes, the discs of the Weasels forming the connecting link, and closely approximating to those of the Cats. The corpuscles of the Otter, however, are much larger than any I have yet seen of the rest of the *Mustelidæ*, and in fact agree very nearly in size with the corpuscles of the Seals and Dogs.

"It has been stated, that in the *Carnivora* the corpuscles are intermediate in size to those of the omnivorous species and of the strictly vegetable feeders—smaller in the *Carnivora*, for example, than in

* In the Menagerie of the Zoological Society this animal is called *Paradoxurus Typus*, but I have been assured that it is the *P. Bondar* of authors; it is the same species as that designated *P. Typus* in the Phil. Mag. for Jan. 1840, p. 28.

† See Lond. and Edin. Phil. Mag. for March 1840, p. 195.

‡ *Ibid*, Nov. 1840, p. 325.

Man and the *Quadrumana*, but larger than in the *Ruminantia*; and the same assertion has been extended to the *Marsupiated*, especially that the red particles of the *Perameles*, which derives its nourishment from the greatest number of organized substances, are larger than the particles either of the carnivorous *Dasyure* or of the herbivorous Kangaroo.

“ This opinion is not supported by numerous measurements given by me in the ‘ Philosophical Magazine ’ for January, February, March and August, 1840. In one of the Ruminants indeed the corpuscles are singularly minute, but in another granivorous animal they are as singularly large; and they are larger in several of the Ruminants than in some of the *Carnivora*. Among the marsupial animals, although the corpuscles of the *Perameles* slightly exceed those of the *Viverrine Dasyure* in size, yet in the *Ursine Dasyure* the corpuscles are larger than in either, and just as large too as those of *Bennett’s Kangaroo*.”

An abstract of the measurements of the blood-corpuscles of the order *Feræ* is subjoined.

Measurements of the Blood-corpuscles of the order Feræ.

The measurements are all expressed in fractions of an English inch, and, for the sake of brevity, the average-sized corpuscles only are mentioned, as deduced from numerous observations in each species.

INSECTIVORA.

Talpa Europæa, <i>Linn.</i> . . .	1·4747
Sorex tetragonurus, <i>Herm.</i>	1·4571
Erinaceus Europæus, <i>Linn.</i>	1·4085

PLANTIGRADA.

Meles vulgaris, <i>Desm.</i> . .	1·3940
Ursus maritimus, <i>Linn.</i> . .	1·3870
— Arctos, <i>Linn.</i>	1·3732
— Americanus, <i>Pallas.</i>	1·3693
— ferox, <i>Lewis & Cl.</i> . .	1·3530
— labiatus, <i>DeBlainv.</i>	1·3728
Procyon lotor, <i>Cuv.</i>	1·3950
Nasua fusca, <i>Desm.</i>	1·3789
— rufa, <i>Desm.</i>	1·3878
Basaris astuta, <i>Licht.</i> . .	1·4033

CARNIVORA.

Paradoxurus binotatus . .	1·4660
— leucomystax, <i>Gray</i>	1·4236
— Bondar.	1·5693
Canis familiaris, <i>Linn.</i> . .	1·3542
— Dingo, <i>Blum.</i>	1·3397
— Vulpes, <i>Linn.</i>	1·4117
— fulvus, <i>Desm.</i>	1·3920
— argentatus, <i>Desm.</i> . .	1·3888
— lagopus, <i>Linn.</i>	1·3888

Canis aureus, <i>Linn.</i>	1·3860
— mesomelas, <i>Schreb.</i>	1·3645
— Lupus, <i>Linn.</i>	1·3625
Lycaon tricolor, <i>Brookes.</i>	1·3801
Hyæna vulgaris, <i>Desm.</i> . .	1·3735
— crocuta, <i>Linn.</i>	1·3820
Herpestes griseus, <i>Desm.</i>	1·4662
— Javanicus?	1·4790
— Smithii, <i>Gray.</i>	1·4466
Viverra Civetta, <i>Linn.</i> . .	1·4274
— tigrina, <i>Schreb.</i>	1·5365
Felis Leo, <i>Linn.</i>	1·4322
— concolor, <i>Linn.</i>	1·4465
— Tigris, <i>Linn.</i>	1·4206
— Leopardus, <i>Linn.</i> . . .	1·4319
— jubata, <i>Linn.</i>	1·4220
— pardalis, <i>Linn.</i>	1·4616
— domestica, <i>Brisson.</i>	1·4404
— Caracal, <i>Gmelin.</i> . .	1·4684
— cervaria, <i>Temm.</i> . . .	1·4220
— Serval, <i>Linn.</i>	1·4129
Galictis vittata, <i>Bell.</i> . . .	1·4175
Mustela Zorilla, <i>Desm.</i> . .	1·4270
— furo, <i>Linn.</i>	1·4134
Lutra vulgaris, <i>Erxl.</i> . .	1·3502
Phoca vitulina, <i>Linn.</i> . .	1·3281

The next paper read was from W. J. Broderip, Esq., in which the author resumes his descriptions of Mr. Cuming's shells.

HELIX (CAROCOLLA) VIRGO. *Car. testá subcomplanato-globosá, nitidá, subdiaphaná, lineis incrementi obliquis creberrimè striatá, suturis et anfractús basalís angulo subelevatis subcrenatis, víx umbilicatá; aperturá auriculato-angulatá; labii limbo subreflexo.*

Var. *a.* *Alba, labii limbo purpureo-brunneo.* Long. $\frac{5}{8}$; lat. $1\frac{1}{8}$ poll.

Var. *b.* *Tota alba.*

Hab. ad insulam Zebu, foliis arborum hærens.

Legit H. Cuming.

The entirely white variety of this delicate shell (which has the appearance of being framed of the purest wax overlaid with a glassy transparent enamel) is rather smaller than var. *a.* The animal in both varieties is of a light bluish green, so that when it is withdrawn into the transparent shell it produces a strong resemblance to *Carocolla Reginae*; and indeed, when Mr. Cuming first saw them, he for a moment thought that he had found large specimens of that lovely shell; but when the animal was taken out, the delusion vanished.

HELIX (CAROCOLLA) DEALBATA. *Car. testá sordidè albá, subflavescente, subdiaphaná, subglobosá, lineis incrementi obliquis creberrimè substriatá, víx subumbilicatá; aperturá auriculatá, magná; labii limbo víx substriato.* Long. $1\frac{1}{2}$; lat. $1\frac{1}{8}$ poll.

Hab. in insulá Siquijor, foliis arbusculorum hærens.

Legit H. Cuming.

The dim and sordid white of this species is enriched when the greyish white animal is withdrawn into the shell.

HELIX (CAROCOLLA) PUELLA. *Car. testá globosá, diaphaná, lineis incrementi obliquis creberrimè substriatá; aperturá auriculato-rotundatá; labii limbo subreflexo.*

Hab. in insulá Camiguing, foliis arbusculorum adhærens.

Var. *a.* *Alba, anfractu basali lineá brunneá subcentrali cincta.*

Var. *b.* *Tota alba.*

Legit H. Cuming.

The colour of the animal is dark greyish white.

HELIX (CAROCOLLA) ROTA. *Car. testá complanatá, rotundatá, subdiaphaná, umbilicatá, supernè lineis elevatis, acutis, infrá lineis elevatis haud acutis, concentricis, regularibus corrugatá, flavescente; anfractibus supernè medio bilineatis, anfractús basalís infrá unilineati angulo acuto, dentato, unilineato; lineis castaneis; aperturá auriculatá; peritrematis unidentati limbo subexpanso albo.* Long. $\frac{5}{8}$; lat. 1 poll.

Hab. in insulá Siquijor, arborum truncis hærens.

Legit H. Cuming.

The animal of this elegantly worked *Carocolla* is yellowish, somewhat like the ground-colour of the shell, which is exquisitely sculptured after the manner of engine-turned trinkets. Above, the elevated concentric lines are sharp, and the shell on that side has somewhat the appearance of a flattened *Scalaria*: beneath, the elevated

lines are rounded, and radiate very regularly from the open *umbilicus*. The chestnut line that borders the sharp dentated edge of the angle of the body-whorl is, beneath, interrupted with white bead-like elevations. All the four chestnut lines of the body-whorl can be seen through the shell when it is placed with the lower side uppermost.

HELIX (CAROCOLLA) ZEBUENSIS. *Car. testá complanato-convexá, solidá, subumbilicatá, purpurascens; lineis incrementi obliquis creberrimè striatá; suturis acutis subelevatis; anfractús basalís angulo acuto; aperturá cæruleo-albá, acuto-auriculari; labii limbo nigro-castaneo, subexpanso, subacuto; epidermide fuscá, subcrassá.*
Long. $\frac{5}{8}$; lat. $1\frac{2}{8}$ poll.

Hab. ad Dalaguete in insulá Zebu, foliis arborum hærens.

Var. *a.* *Albido-fusca nigro-castaneo interruptè lineata et maculata.*

In this variety the edge of the whorls above the suture is considerably elevated with a gutter or furrow on the upper side. The brown interrupted lineations take the form of bands running in the directions of the whorls, and the lower side of the body-whorl is marked immediately under the edge of the angle with a circle of large, well-defined, tessellated spots, which reach to the edge of the angle of the whorl.

Var. *b.* *Fusca anfractibus suturam juxta obscurè maculatis.*

In this variety the angle of the whorl next to the body-whorl is elevated, but there is no gutter above.

Var. *c.* *Albescens, suturis et anfractús basalís angulo nigro-castaneo maculatis, infrà nigro-castaneo creberrimè taniata.*

In this variety there is no elevation of the suture; the broad tessellated band near the angle of the body-whorl below, and the interrupted spotted and lineated bands which ornament the lower side of the shell, are neatly and prettily disposed.

Var. *d.* *Fusco-albescens rubro-brunneo obliquè strigata.*

In this variety the edge of the penultimate whorl is elevated, and has a slight gutter on the upper side. The shell beneath is obscurely lineated in the direction of the whorl, and the red-brown dashes radiate from the angle of the whorl to the interrupted lineations which gird it. On the upper side the bold oblique stripes of the same colour completely cross the whorls.

Var. *e.* *Tota fusca.*

In this variety the angle of the upper whorls is very much elevated.

The ground-colour of all these varieties is a purple or red-brown, and the pattern of the variegated specimens resides in the *epidermis*, or rather is produced by the intermixture of the ground-colour of the shell and of the *epidermis*. Thus, if any of the variegated varieties be immersed in water, the pattern vanishes as long as the shell remains wet; when it is dry, the pattern is restored. If, for instance, var. *a.* and var. *e.* be immersed, the general colour becomes identical, and the dark interrupted lineations of the former can hardly be traced. The absence or presence of the elevation of the edge of the upper whorls, in the different varieties of this species, shows that such

a conformation cannot be trusted as a specific character. The animal is a dark purplish brown.—W. J. B.

Mr. Yarrell exhibited a British example of the *Motacilla alba* of Linnæus, which had been shot at Kingsbury. Two pairs of this species of Wagtail were seen by Mr. Bond near the reservoir in the early part of the present month, and, although they were very shy, that gentleman, who furnished Mr. Yarrell with the specimen exhibited, succeeded in shooting three of them, two males and one female.

M. Leonard read a paper on the intelligence of animals, which he illustrated by means of two pointer dogs which he had trained for the purpose.

To show that these animals possessed the power of comparison, he placed different objects upon the ground, such as a glove, a roll of paper, a small box, &c., and having kept similar objects himself, he showed them one after another to either of the dogs, and desired the animal to fetch that which was like it from the ground. The dogs performed this task correctly, and all others which they were desired.

Cards, with numbers from 1 to 9 painted upon them, were placed upon the ground, and the dogs fetched any particular number they were bidden: a number brought, M. Leonard ordered the dog to take back again and exchange for another number, and at the same time to deposit it in the place of that number. The dogs also selected a card of a particular colour, when desired, from among many of different colours. Pieces of bread were placed on the ground, and in placing them, their master called them by the names of different numbers in an irregular manner, and afterwards ordered the dogs to fetch the piece of bread he had called a certain number. These and various other experiments (some with pieces of meat) were all performed correctly, and tended to show the great intelligence of the animals and the control which their master had obtained over them.

The dogs were named Phylax and Braque, and either dog, upon his name being called, performed the task he was ordered; but one of them appeared to be more quick than the other.

June 8.—William Yarrell, Esq., Vice-President, in the Chair.

Read a paper by G. B. Sowerby, Jun., Esq., entitled "Descriptions of eight new species of the genus *Ranella*," in the collection of Mr. Cuming.

1. *RANELLA VEXILLUM*, Conch. Illustr., f. 3. *R. testâ ovali, ventricosâ, subacuminatâ, pallidè brunneâ, transversè striatâ, fasciis rufescentibus elevatis noduliferis cinctâ; varicibus irregularibus, decumbentibus, latis; aperturâ magnâ albâ, intûs griseo fasciatâ, posticè vix canaliferâ, anticè in canalem brevem rectum, latum terminante; labio interno sublævi decumbente, dentibus lævibus paululùm incrassato; labio externo subexpanso, leviter undulato, dentibus ferè obsolete intûs incrassato.*

Long. 3.40; lat. 2 poll.

Hab. ad (Chiloe) Conception.

Mr. Cuming collected specimens at rocky places from three to six fathoms deep. The outer lip is more expanded, and the knotted brown bands are narrower and more numerous than in *R. argus*.

2. *RANELLA CRUENTATA*, Conch. Illustr., f. 5, 5*. *R. testá subquadrátá, rugulosá albá vel pallidè fulvá, rubro-maculatá, inter varices ad angulum anfractuum tuberculis magnis tribus, in medio tribus minoribus; varicibus elevatis, utrinque foveolatis; aperturá paululùm angustátá, extremitatibus validissimè canaliferis; labio interno decumbente, dentibus acutis instructo, maculis sanguineis 5 ad 6 in medio picto; labio externo complanato, subdigitato, intus dentibus validis instructo.*

Long. 1·50; lat. 1·20 poll.

Hab. ad insulam Ticao, Philippinarum. H. Cuming legit.

Found on coral reefs. This species is remarkable for the well-defined spots of blood-red colour by which that part of the inner lip which rests upon the body-whorl is ornamented. A darker variety occurs, in which the spots are of a strong brown colour.

3. *RANELLA NANA*, Conch. Illustr., f. 6. *R. testá elongato-ovali, lævi, inter varices nebuloso-purpureá, in medio anfractu fasciá albá cinctá, ad angulum anfractuum tuberculis acutis quatuor, anteriùs tuberculis parvis; varicibus prominentibus, anticè laqueatis, posticè canalem exhibentibus; aperturá ovali, ad extremitates validissimè canaliferá; labio interno granoso; labio externo valdè denticulato.*

Long. 1·80; lat. 1·05 poll.

Hab. ad insulam Panama, Philippinarum. H. Cuming legit.

Found in coarse sand at seven fathoms.

4. *RANELLA ALBO-FASCIATA*, Conch. Illustr., f. 14. *R. testá ovali, subcompressá, granulósá, fusco-purpureá, fasciá albá in medio anfractu cinctá, lineis moniliformibus numerosis et ad angulum 6 ad 7 tuberculis cinctá; varicibus granuloso-tuberculiferis; aperturá ovali, ad extremitates validissimè canaliferá; labio interno granoso; labio externo valdè denticulato.*

Long. 1·80; lat. 1·20 poll.

Hab. ad insulam Panama, Philippinarum.

Much broader and more completely granulated than the former, which is nearly all over smooth. In this respect our shell resembles *R. granulata*, Lam., but it is neither so oval nor so compressed, the varices are more strongly marked, and the posterior canal is more perfect.

Found in coarse sand at 10 fathoms.

5. *RANELLA RHODOSTOMA*, Conch. Illustr., f. 10. *R. testá subquadrátá, rugulosá, granulátá, pallidè fulvá, rufo-punctatá et maculatá, inter varices tuberculis prominentibus tribus ad angulum, tribus in medio anfractu; aperturá roseo-purpureá, paululùm angustátá, ad extremitates valdè canaliferá; labio interno granuloso propè canales transversè dentato, labio externo sub-expanso, undulato, intus dentato; varicibus granoso-tuberculatis, validis, utrinque foveolatis.*

Long. 1·15; lat. ·85 poll.

Hab. ad insulam Masbate, Philippinarum.

Found on coral reefs by Mr. Cuming. It is a pretty little species with a delicately purple aperture.

6. *RANELLA SUBGRANOSA*, Conch. Illustr., f. 18. *R. testâ ovali subangulatâ, purpureo-fuscâ, brunneo-fasciatâ et maculatâ, transversè lineis elevatis, moniliformibus alternantibus striatâ; ad angulum anfractuum tuberculis acutis; varicibus elevatis, utrinque subfoveolatis, granoso-tuberculatis; aperturâ ovali, albâ, intùs pallidè purpureâ; canali postico lato, antico subrecurvo, lato; labio interno tenui, posticè dentato anticè extanti; labio externo crenulato validissimè dentato, ad canalem posticum aculeato, anticè subexpanso.*

Long. 2·85; lat. 1·70 poll.

Hab. ad sinus Manillæ. H. Cuming legit.

This species very nearly resembles *R. elegans*, Beck, Chemn. 1270, Conch. Illustr., f. 17, of which it may perhaps be only a local variety. Our shell is of a more oval shape and is more evenly granulated in every part. Found in sandy mud at ten fathoms.

7. *RANELLA NEGLECTA*, Conch. Illustr., f. 22. *R. testâ subquadratâ, brevi, lineis granulatis transversè striatâ, pallidè fulvâ, fusco-maculatâ; inter varices ad angulum posticum tuberculis tribus magnis, in medio tribus ad quatuor parvis, prope caudam uno, et aliquando serie moniliformi tuberculorum parvorum; varicibus crassis lirâim granulosis posticè foveolatis; aperturâ ovali albâ; canali postico brevi, recto; canali antico brevi, subrecto; labio interno decumbente, granulato, prope canalem posticum acutè denticulato; labio externo, minutè denticulato, prope canales solùm reflexo.*

Long. 1·60; lat. 1·15.

Hab. ad insulam Ceylon.

This shell, which is now common, differs from *R. crumena* in the following respects: it is shorter, the tubercles are more obtuse, the canals are shorter and straighter, the outer lip is scarcely reflected, and the inner lip is not raised at the caudal extremity.

8. *RANELLA RUGOSA*, Conch. Illustr., f. 7. *R. testâ ventricosâ, granulosâ, angulatâ, pallidè fulvâ, fusco-maculatâ; inter varices ad angulum posticum tuberculis tribus obtusis, granulosis, inter granula fusco interrupto-lineatis, in medio lined duplicatâ moniliformi; caudam versùs lineis quinque alternantibus moniliformibus; varicibus crassis, granoso-tuberculatis, utrinque validissimè foveolatis; canali antico tortuoso, magno; aperturâ rotundato-ovalis albâ, canali postico sub-elongato; labio interno tortuoso, propè extremitates validè extanti; labio externo reflexo, extùs laqueato, intùs quinquefariam bi-denticulato, denticulis foveolato.*

Long. 2·30; lat. 1·50.

Hab.

This species has not the thickness, flatness, nor the elongated, curved, posterior canal of *R. bufonia*, nor are the tubercles so large.

BOTANICAL SOCIETY OF EDINBURGH.

† This Society held its first meeting for the season on Thursday the 11th of November, 1841, Professor Graham in the Chair.

The following papers and communications were read:—

1. Account of a Botanical Excursion to Skye and the Outer Hebrides, during the month of August 1841, by Professor Balfour and Mr. Charles C. Babington; and remarks on the plants observed by them in the Islands of North Uist, Harris and Lewis.

In this communication the authors drew attention chiefly to those facts which tend to illustrate the variations produced by climate, soil and elevation. In Skye their observations were confined to the south-western part of the island. They landed at Armadale, and passing by Knock, Ord and Strathaird to Loch Coiruisg, they crossed the Cuillin Hills to Sligachan, and from thence went by Bracadale to Dunvegan. Among the plants observed in this route may be mentioned *Rumex aquaticus*, *Atriplex rosea*, *Arabis petræa*, *Myriophyllum alterniflorum*, *Potamogeton oblongus*, *Orobanche rubra*, *Mimulus luteus*, &c.

From Dunvegan they crossed the Minsh to Loch Maddy in North Uist, and after examining the botany of that island, they proceeded to Harris and Lewis.

On the lofty mountains of the Forest of Harris, some of which they reckoned to be at least 3000 feet high, they were surprised to find very few alpine plants, for which they could only account by supposing the climate of the island to be so modified by the vicinity of the great Atlantic Ocean, as to be too mild for the production of the usual alpine vegetation.

The following are mentioned among the more interesting plants found in Harris and Lewis:—*Lamium intermedium*, *Ruppia maritima*, *Pinguicula lusitanica*, *Thalictrum alpinum*, *Salix herbacea*, *Aira alpina*, *Saussurea alpina*, *Luzula spicata*, *Arabis petræa*, *Silene acaulis*, *Blysmus rufus*, *Juncus balticus*, *Scirpus lacustris*, &c. They also gathered *Hymenophyllum Wilsoni* among rocks upon the summit of Chesham, apparently the highest mountain of the range.

The number of species observed in North Uist, Harris and Lewis, during this excursion, was 311, of which 21 belonged to the orders *Filices*, *Lycopodiaceæ* and *Equisetaceæ*. The number of true ferns was 14, being in the proportion of 1 to about every 22 of the flowering plants; that is, they form about 1-22nd part of the whole number of species at present known to be indigenous in these islands. Mr. T. Edmonston, jun. records 249 species of native plants for the Shetland Islands (Ann. Nat. Hist. viii. 287), of which 14 are ferns, *Lycopodiaceæ* and *Equisetaceæ*, the number of true ferns being 7, thus showing a proportion of 1 fern to about 33 flowering plants. Owing to the necessarily imperfect character of the Long Island list, it is impossible to draw any satisfactory conclusions, from the above proportions, between the flowering plants and ferns; yet it may be noticed that there is a great preponderance of ferns in both these northern and insular countries, although the actual numbers recorded

are remarkably small. The ferns in Shetland are less numerous than those in Iceland or Faroe, while those of the Long Island exceed the Faroe species by four, and are exactly equal to the number found in Iceland,—the Faroe and Iceland lists being the smallest recorded in Mr. Watson's valuable paper on the Distribution of Ferns, recently published in the Transactions of this Society (vol. i. p. 89).

The more mountainous character of the Long Island will probably account for the much larger proportion (1 to 22) which its ferns bear to the flowering plants, than that which appears to exist in Shetland; for although considerable allowances be made for the imperfect state of the Long Island list, on account of the short time employed in its preparation, yet it does not seem probable that the number of its flowering plants will be so far increased as to raise their relative proportion as high as that shown to exist in Shetland, since this would require an addition of 151 species, even if the number of ferns remained stationary.

The communication concludes as follows :—“ We must be allowed to impress upon the Society, that this tour is not of the less interest for not having produced any plants new to the British Flora, since we consider the determination of the flora of any district, peculiar either in its structure or situation, to be of importance, as elucidating the effect of soil or climate upon the distribution of plants.

“ We would also take this opportunity of expressing our sense of the obligations under which we lie to the gentlemen of Skye and the Long Island, who in a truly kind and liberal manner exercised their hospitality towards our party, and greatly contributed to the pleasure, indeed we may say to the success, of the excursion.”

2. On the Anatomy and Physiology of the seed of *Phaseolus vulgaris*, or French Bean, by Dr. Spencer Thomson, Burton-on-Trent.

In this paper, which was accompanied by illustrative drawings, the author, after giving an elaborate dissection of the seed, stated a variety of circumstances relative to its mode or course of germination, and traced the analogy between that process and the growth of the foetus in the animal kingdom. He also noticed M. DeCandolle's views on the subject, and pointed out the results which seemed to arise from them.

3. On the discovery of three species of Fungi new to the British Flora, viz. *Tuber ferrugineum*, *Æcidium Thesii*, Leefe, and *Uredo Symphyti*, D. C., by the Rev. J. E. Leefe.

With regard to the first of these fungi, Mr. Leefe says,—“ The specimens are in general of a rich red bronze colour. Their smell is peculiarly strong and penetrating, so that on receiving a letter enclosing specimens, Mr. Berkeley can, before opening it, determine positively what it contains.”

4. Notice of the discovery of *Cerastium triviale* β . *holosteoides*, Fries, near Kinfauns Castle, Perthshire; and of *Rubus arcticus*, near the head of Glen Tilt, Perthshire, by Mr. J. Robertson, Kinfauns Garden.

Considerable interest was manifested respecting the occurrence of the latter species in the British Flora, and some discussion took place

